

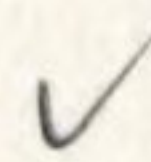
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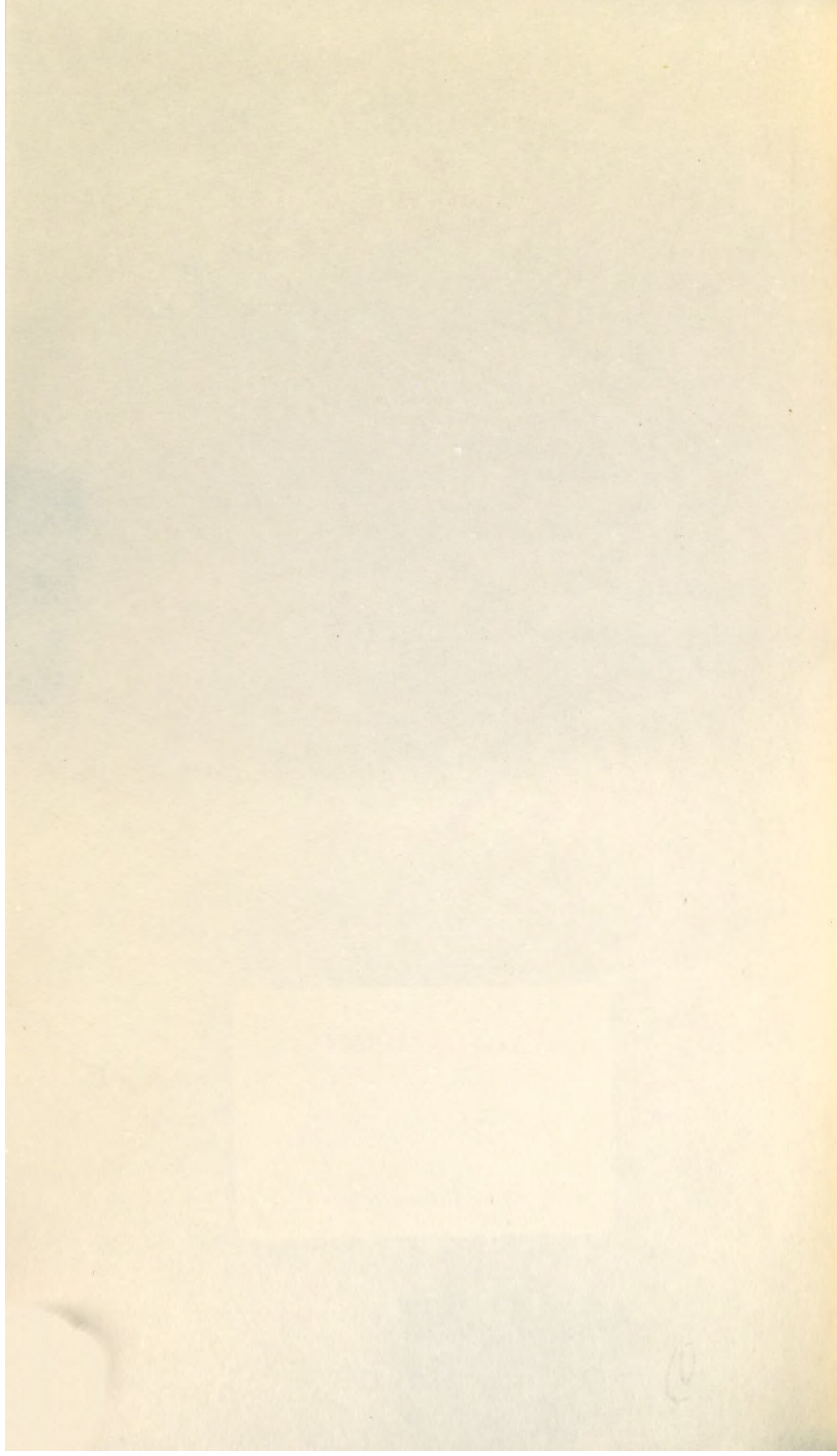
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THE
NATURAL HISTORY
OF
BRITISH FISHES,
INCLUDING
SCIENTIFIC AND GENERAL DESCRIPTIONS
OF THE
MOST INTERESTING SPECIES,
AND AN
EXTENSIVE SELECTION
OF
ACCURATELY FINISHED COLOURED PLATES.

TAKEN ENTIRELY FROM
ORIGINAL DRAWINGS,
PURPOSELY MADE FROM THE SPECIMENS IN A RECENT STATE,
AND FOR THE MOST PART WHILST LIVING.

IN FIVE VOLUMES.

VOL. V.

BY E. DONOVAN, F.L.S.

AUTHOR OF THE NATURAL HISTORIES OF BRITISH BIRDS,
INSECTS, SHELLS, &c.

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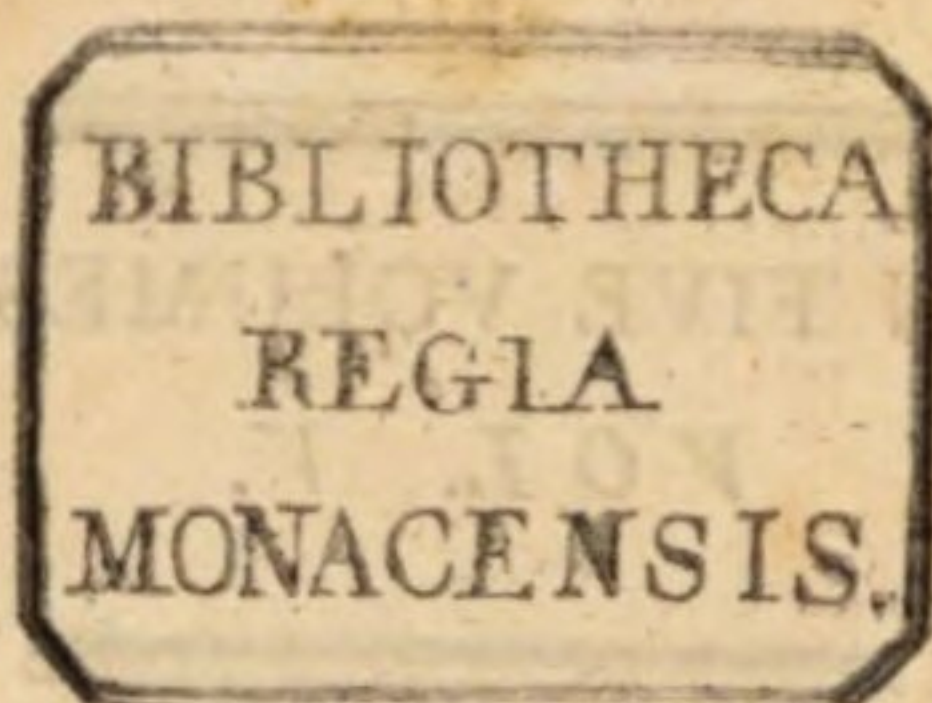
F. C. AND J. RIVINGTON, No 62, ST. PAUL'S CHURCH-YARD.

1808.

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London, Pub.^d at the Act directed, by E. Donovan & F. & C. L. Rivington, Sep.^r 1st 1806.

THE
NATURAL HISTORY
OF
BRITISH FISHES.

PLATE XCVII.

ZEUS LUNA.

OPAH, OR KING FISH.

** *PISCES THORACICI.*

GENERIC CHARACTER.

Head compressed, sloping: upper lip arched by a transverse membrane. Tongue subulate: gill membrane with seven perpendicular rays, the lower transverse: body compressed, thin, shining: rays of the dorsal fin in general filamentous.

SPECIFIC CHARACTER

AND

SYNONYMS.

Tail lunated: body smooth: back violaceous, and sides green, with oblong silvery spots: fins falcated, and scarlet.

ZEUS LUNA: cauda lunari, corpore lævi, dorso violaceo, lateribus viridibus argenteo guttato, pinnis falcatis coccineis.

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ZEUS LUNA : cauda sublunari, corpore rubente albo-guttato. *Gmel.*

Linn. Syst. Nat. T. 1. p. 3. 1225. n. 7.

ZEUS OPAH : cauda sublunari, corpore nunc rubente, nunc viridi ;
nunc purpureo, albo-guttato. *Vivarium Naturæ.*

—*Shaw Nat. Miscel. v. 4. p. 140.*

ZEUS GUTTATUS. *Brunnich.*

POISSON DE LUNE. *Duhamel des peches. 3. p. 74. t. 15.*

CHRYSOSTOSE LUNE. *Lacepede, &c.*

OPAH. *Phil. Trans. abr. 11. p. 879. t. 5. Penn. Brit. Zool. 3.*
n. 101.

OPAH OR KING-FISH. *Turt. Linn. Syst. v. 1. p. 760. n. 3.*

Opah Dory. *Shaw Gen. Zool. v. 4. p. 2. 287.*

Opah or King-fish. *Sowerby, Brit. Miscel. p. 22.*

The Opah claims a distinguished place in the history of British fishes : it is admitted by writers as one of the most beautiful examples of the finny race hitherto discovered in the European seas, nor is it less deserving our attention for its rarity than beauty.

That this splendid fish has at various times been observed in the northern seas of Europe we have the authority of several naturalists of respectability ; it is in particular described as a northern fish by Strom in his History of Søndmor. According to Duhamel, Lacepede, and other French writers, it is likewise found, though rarely as far to the southward as the coast of Normandy : its occasional appearance in the British seas is sufficiently well attested ; and if Dr. Mortimer was not misled by the information obtained from the Prince of Anamaboo, it is also a native of the seas of Africa, and in the latter far more abundant than it appears to be elsewhere.

PLATE XCVII.

Several specimens of this splendid fish have been captured or cast ashore upon our coasts, notwithstanding which we cannot hesitate to consider it as a scarce fish. Its appearance on our coasts has been at periods very remote from each other, and we think it not improbable that it has seldom occurred without being duly noticed by some intelligent, if not very scientific characters. We are inclined to suspect that several of the British species of fish much less rare than the Opah have hitherto been considered more uncommon, either because they are deficient of beauty, singularity, or magnitude, to recommend them to the immediate attention of general observers, and that, from their localiry, they have rarely occurred to the observation of naturalists. The Opah is, on the contrary, a superlatively grand and striking object, such as would naturally arrest remark, and it is therefore not unlikely that in almost every instance of its being captured on our coast, it has excited so much curiosity as to be recorded in some of the diurnal prints; and the description of such a fish, if only slightly accurate, could not easily be mistaken.

The Opah is described by Sibbald, in his History of Scotland, under the title of *Pisces maculis aspersus non scriptus pollices, 42 longus*, and figured in the sixth plate of that work. Mr. Pennant tells us, “we have only five instances of this fish being taken in our seas, four of them in the north, viz. twice off Scotland, once off Northumberland, one in Fileybay, Yorksire, and a fifth at Brixham in Torbay, in 1772.”

The first account we have of the Opah that merits particular observation appeared in the Philosophical Transactions for the year 1750. This was drawn up by Dr. Mortimer, from a specimen of the fish, captured on the shore of Leith, and submitted about that period to the inspection of the Royal Society. Dr. Mortimer's

PLATE XCVII.

description is at some length, and deserves, for its accuracy, to be repeated in this place.—“ This fish,” says Dr. Mortimer, “ is smooth skinned, has no scales, or teeth : it has one erect fin on its back, which arises below its neck, and runs within a little of its tail : on each side, about the middle, between its back and belly, a little forward of the vent, arise a pair of fins : from behind the vent runs one fin, within a little of the tail : the tail-fin is large and forked : the eyes are large ; the irides are scarlet, encompassed with a circle of gold-colour, verged with scarlet : its nostrils are placed above its eyes : the back and upper part of the body, quite to the tail, was of a dark blue or violet-colour ; these and the sides of the body, which were of a bright green, were all speckled with oblong white spots : the chaps were of a pale red ; the nose, gills, and belly, were of a silver-colour, and all the fins of a bright scarlet. It was three feet seven inches long, and three feet ten inches round, in the thickest part : it weighed eighty-two pounds : its mouth was small ; its tongue thick, almost like the human tongue in shape, but rough, and thick set with beards or prickles, which pointed backwards ; so that any thing might easily pass down, but could not easily slip back again : therefore these might serve instead of teeth for retaining its prey or food : its gills resembled those of the salmon : its body grows very taper towards the tail ; and from being compressed to ten inches thickness, becomes near the tail almost round, and about three inches thick : the whole shape of this fish much resembles that of the sea-bream, but it differs in size, being much larger, and in not having teeth nor scales : the fin standing erect on the back has some aculei next the neck, and rises up to eight inches ; but in the middle diminishes to one inch ; and near the tail rises again to about three inches, the belly-fin, opposite to this, spreads three inches near the tail, and diminishes towards the vent : the tail-fin is forked, and spreads twelve inches : the gill fins are nine inches long and three

PLATE XCVII.

wide at their basis: the two belly fins were eleven inches long and three wide at their basis: it seems to be a new species of fish, not yet described by any author." Dr. Mortimer adds, that the Prince of Anamaboo, a country on the coast of Africa, being then in England, recognized the fish immediately as a species common on that coast, and said it was good to eat.

In the year 1769, another specimen was taken near Newcastle, of which the following account was written by Mr. Robert Harrison, of that place.

" Newcastle, Sept. 12th, 1769.—On Saturday last was thrown upon the sands at Blyth, a very rare and beautiful fish, weighing between seventy and eighty pounds; shaped like the Sea-Bream: the length was three feet and a half; the breadth, from back to belly, almost two feet; but the thickness, from side to side, not above six inches: the mouth small for the size of the fish, forming a square opening, and without any teeth in the jaws: the tongue was thick, resembling that of a man, but rough, and thick set with beards or prickles, so that any thing might easily pass down, but could not easily return back; therefore these might serve instead of teeth to retain its prey: the eyes remarkably large, covered with a membrane, and shining with a glare of gold: the cover of the gills like the Salmon; the body diminishes very small to the tail, which is forked, and expands twelve inches: the gill-fins are broad, about eight inches long, and play horizontally: a little behind their insertion the back fin takes its original, where it is about seven inches high, but slopes very suddenly, running down very near the tail, and at its termination becomes a little broader: the belly-fins are very strong, and placed near the middle of the body: a narrow fin also runs from the anus

PLATE XCVII.

to the tail: all the fins, and also the tail, are of a fine scarlet; but the colours and beauty of the rest of the body, which is smooth and covered with almost imperceptible scales, beggars all description: the upper part being of a bright green, variegated with whitish spots, and enriched with a shining golden hue, like the splendour of a peacock's feather: this by degrees vanishes in a bright silvery, and near the belly the gold again predominates in a lighter ground than on the back."

The third specimen, which, as before observed, was taken in Torbay, in the year 1772, is thus described by Mr. Pennant, upon the authority of a gentleman who saw the fish soon after it was taken, and transmitted an account of it to be inserted in the British Zoology.—“ This fish weighed a hundred and forty pounds. The length was four feet and a half: the breadth two feet and a quarter: the greatest thickness only four inches. Its general colour was a vivid transparent scarlet varnish over burnished gold, bespangled with oval silver spots of various sizes: the breast was a hard bone, resembling the keel of a ship. The flesh looked, and tasted like beef.”

Several of the French Naturalists describe the Opah either under the name of *Poisson de Lune*, after Duhamel, or the more modern appellation of *Chrysostose Lune*, (*Chrysostosus*) which latter was assigned to it by Lacepede, when he separated it from the *Zeus* genus, in which it stands in the Gmelinian *Linn. Syst.* and constituted a new genus for the reception of this single species. Bosc, one of the latest of those writers, affords a lively description of the Opah, in the following words. “ C'est un magnifique poisson. Des reflets d'azur, de vert clair, d'argent, se jouent sur un fond d'or, au milieu d'un grand nombre de taches couleur de perle ou de saphir. Les

PLATE XCVII.

nageoires sont d'un rouge éclatant. Il a la lèvre supérieure extensible ; la mâchoire inférieure plus longue ; la nageoire dorsale en forme de faulx, avec un ou deux rayons aiguillonnés et quarante-six articulés ; un rayon aiguillonné et trente-cinq articulés à l'anale ; la caudale fourchue ; ses écailles sont unies. Le Chrystose lune se pêche, mais très rarement, dans les mers d'Europe : il acquiert quatre à cinq pieds de long."

Since the publication of Mr. Pennant's Zoology, three specimens of the Opah have been caught on the coast of Scotland ; two in the Firth of Forth, and the third at no very considerable distance from that place. One of the latter, a fish in fine preservation, is at present in our collection. Another, rather smaller, was discovered stranded on the coast, by some labourers employed in the colliery trade, and was eaten at a neighbouring cottage ; and the fate of the third is not correctly known. Besides those Scottish specimens, another was caught some time ago on the western coast of England, by the fishermen of those parts ; who afterwards disposed of it in a mutilated state to S. P. Bryer, Esq. of Weymouth ; some account of which has recently appeared in a work entitled the British Miscellany *.

* Pl. 22. *Brit. Misc.* It might be improper to conclude our account of the Opah without adverting to a few observations that have recently appeared in the work above mentioned. The compiler informs us, " he knows of no coloured figure of this fish," from the tenor of which it is possible the reader might conclude that no such figure had been previously published, which would not be correct, as a coloured plate of it does actually occur in the Naturalist's Miscellany of Dr. Shaw, vol. iv. pl. 140. This is an oversight that might easily be committed, though it were better to have been avoided. With regard to the other remarks they appear, to us at least, incomprehensible. We are told, for instance, " it is rather astonishing that Linnæus, Gmelin or Turton, do not men-

PLATE XCVII.

The history of this fish is so highly interesting, that we have been tempted to digress at more than usual length, in order to insert whatever

tion it!"—Can the compiler be really serious in this assertion?—If he should be so, such observations are too puerile and presuming to merit criticism.

Lest however an assertion so confidently advanced, might tend to mislead the uninformed, it will be incumbent to say that the Opah is very fully described by Gmelin in his edition of the *Systema Naturæ*, and it is equally certain that Dr. Turton speaks of it at considerable length; not precisely in the words of his original (the *Gmelinian Syst. Nat.*) for he has even amplified upon the subject by collecting additional information from other sources: the author of *Vivarium Naturæ* it is very evident, though Dr. Turton does not mention it, has furnished him with the specific character which he has adopted in preference to that proposed by Gmelin. He likewise adds, that the Opah is found on the British coasts, a circumstance omitted in the Gmelinian description. We conceive it may not be amiss to transcribe the words of Gmelin at length, and also those of Turton, in order to remove the slightest possibility of doubt on this subject that may be occasioned by the unqualified assertions of the British Miscellany.

"Zeus Luna: cauda sublunari, corpore rubente albo-guttato. *Du Hamel des pêches* 3. p. 74. t. 15. Poisson de lune.

Habitat in mari Normaneniam alluente, ultra 3 pedes longus, diu extra aquam vivax, squamis vix conspicuis uti exalbida parum adhaerentibus vestitus, extra aquam aureo, argenteo, caelesti splendore refulgens.*

Caput breve, rotundatum, rubrum, hinc inde aureum; oculi magni; dentes minutissimi; rictus amplus; pinnæ rubræ, cauda fere alba." *Gmel. Linn. Syst. Nat. T. 1. p. 3. 1225. n. 7.*

* Gmelin is correct in describing the scales of this fish as being very small: in our specimen they may be observed on close inspection, but at the first glance the skin appears perfectly smooth. The figure of the Opah in the British Miscellany is inaccurate therefore in this respect, for although it does not exceed the length of four or five inches, the scales are represented more conspicuous than they appear in a specimen that measures two or three feet in length.

PLATE XCVII.

might appear in the slightest degree material, from the observations of preceding authors. We shall now proceed to offer an accurate though concise account of the specimen before us, with the view of pointing out in the clearest possible manner, those particulars in which our fish accords, or disagrees, with the descriptions those authors have previously afforded.

The total length of our specimen, from the extremity of the jaws to the tip of the tail, is three feet two inches; and the greatest depth, one foot five inches. The relative proportions of the respective parts are delineated with sufficient accuracy to render any minute detail in this respect superfluous. The same may be observed with regard to the general aspect and disposition of its colours, allowing only for the imperfection of the imitative art;—for the inability of the artist to convey that precise idea of its matchless combination of changeable, vivid, and metallic hues, with which the splendid original is adorned by the hand of nature!—The prevailing colours on the back is deep blue inclining to regal purple, below which the purple is glossed in various directions of light with a reddish and golden hue, blending into green upon the sides, and the green fading to yellow as it approaches the silvery white of the abdomen. In some speci-

“Zeus Opah. *Z. cauda sublunari*, corpore nunc rubente, nunc viridi, nunc purpureo, albo-guttato.” *Vivarium Naturæ. Nat. Miscel.* 4. t. 140.

“Zeus Luna. Opah-King-Fish. Tail somewhat lunate; body beautifully red, green or purple, with oval white spots.

“Inhabits the coast of Normandy: rarely found on the British; above three feet long; is of all the European fish the most rich and splendid in its colours; body very deep from the back to the chest, and tapering very small to the tail, covered with hardly visible scales. Head short, rounded, red, with golden patches; eyes large; teeth very small; mouth large; fins scarlet.” *Turton, v. 1. p. 760.*

PLATE XCVII.

mens we rather suspect the general ground colours are darker, or more inclining to purple, or reddish, instead of green, on the sides. The whole of the body is covered with a great number of large distinct oval silvery spots, which produce an appearance no less singular than grand in the aspect of the fish; and what still more contributes to its beauty, is the brilliant colour of the fins, all of which are a fine scarlet. The surface of the skin is remarkably smooth, and covered with scales that are scarcely perceptible: the lateral line is irregular, and somewhat incurvated at the commencement.

It will be observed, on a slight inspection of our drawing, that some material difference exists between our specimen and those represented by former writers. That this difference may have arisen from the less perfect condition of the fish examined by those writers, rather than from any oversight, we may possibly admit. But to say the least, if we are to rely on the figures and description that have previously appeared, the specimens they have examined must have been defective. In proof of this we need only adduce one particular, the preposterous length of the pectoral fins, a circumstance which none of the British writers have mentioned. Those fins, in the perfect fish are so remarkably long, that when placed erect, they reach even above the back, insomuch that the tips of both those fins are seen in this position, rising above the dorsal fin towards the middle of the back. This is a most striking character of the fish, and does not appear in any of the figures at present extant that we are acquainted with. It should however be remembered, that very few of those figures which do occur are original: that which first appeared in the Philosophical Transactions, to illustrate the description given by Dr. Mortimer, is the subject repeated in the British Zoology of Mr. Pennant, in the General Zoology of Dr. Shaw, and

PLATE XCVII.

various other works, all which represent the pectoral fins much too short: those fins were probably mutilated in the fish examined by Dr. Mortimer, and having been so represented in his drawing, would of necessity be represented in the same manner in other figures copied exclusively from it. The dorsal fin at the commencement, the ventral fins, and the extreme tips of the tail, are also longer and more falcated than are usually represented. The dorsal fin contains fifty-four rays: pectoral, twenty-eight rays: ventral, ten rays: anal, twenty-six rays; and tail, thirty.

PLATE XXIX

various other works, all which represent the pectoral fins much too short: those fins were probably mutilated in the fish examined by Dr. Mortimer, and having been so represented in his drawing, would of necessity be represented in the same manner in other figures copied exclusively from it. The dorsal fin at the commencement of the ventral fins, and the extreme tips of the tail, are also longer and more falced than are usually represented. The dorsal fin contains fifty-four rays: pectoral, twenty-eight rays: ventral, ten rays: anal, twenty-six rays: and tail, thirty.



PLATE XCVIII.

CLUPEA ALOSA, *jun.*

WHITE BAIT.

WHITE BAIT. *Appendix to the BLEAK. Penn. Brit. Zool. vol. 3. p. 372.*

WHITE BAIT. *Var. of CYPRINUS ALBURNUS, BLEAK. Turt. Syst. Nat. v. 1. p. 885.*

WHITE BAIT. *Append. CARP. Shaw Gen. Zool. vol. 5. p. 1. p. 246.*

When the true character of the White Bait becomes more generally understood, and the veracity of those remarks we shall offer in the sequel is sufficiently confirmed by the observation of other naturalists, it will perhaps appear that it has remained with us to remove the mysterious veil that has hitherto enveloped the history of this little fish in obscurity. To what peculiar circumstances we are to attribute the errors that have prevailed among writers respecting this fish, we cannot easily imagine: unless, as we suspect, they never had an opportunity of examining it; but that they have actually been deceived we are perfectly satisfied. This assertion is not advanced on slight surmises, for some pains has been taken by us to investigate the history of this heretofore ambiguous fish: we have examined it repeatedly, and have now before us a great variety of specimens eluci-

PLATE XCVIII.

datory of the different transitions of its growth from a diminutive size, to the full dimensions of those delineated in our plate. Every one of those bear the most striking semblance of the parent fish, and afford an incontrovertible evidence that the White-bait is really the fry of the common Shad. We shall premise our enquiry by introducing the observations of Mr. Pennant concerning it, in the result of which he labours to prove that the White-bait is not the young Shad, or even a fish of the *Clupea*, but one of the *Cyprinus* genus, approaching nearest to the Bleak, and shall conclude with stating our reasons for dissenting from an opinion so long established and so uniformly adopted by later writers.

“ During the month of July (says Mr. Pennant) there appears in the river Thames, near *Blackwall* and *Greenwich*, innumerable multitudes of small fish, which are known to the *Londoners* by the name of *White Bait*. They are esteemed very delicious when fried with fine flour, and occasion during the season a vast resort of the lower orders of epicures to the taverns contiguous to the places where they are taken at.”

“ There are various conjectures about this species, but all terminate in a supposition that they are the fry of some fish, but few agree to which kind they owe their origin. Some attribute it to the Shad, others to the Sprat, the Smelt, and the Bleak. That they neither belong to the Shad, nor the Sprat, is evident from the number of branchiostegous rays, which in those are eight, in this only three. That they are not the young of Smelts is as clear, because they want the *pinna adiposa*, or rayless fin; and that they are not the offspring of the Bleak is extremely probable, since we never heard of the White-bait being found in any other river, notwith-

PLATE XCVIII.

standing the Bleak is very common in several of the *British* streams : but as the White-bait bears a greater similarity to this fish than any other we have mentioned, we give it a place here as an appendage to the Bleak, rather than form a distinct article of a fish which it is impossible to class with certainty."

" It is evident that it is not of the Carp or *Cyprinus* genus: it has only three branchiostegous rays; and only one dorsal fin; and in respect to the form of the body, it is compressed like that of the Bleak.

" Its usual length is two inches: the under jaw is longest: the irides silvery, the pupil black: the dorsal fin is placed nearer to the head than to the tail, and consists of about fourteen rays: the side line is straight: the tail forked, the tips black.

" The head, sides, and belly are silvery; the back tinged with green."

In the General Zoology of Dr. Shaw, the White-bait is described as a species of the Carp or *Cyprinus* genus. It is observed by this writer, that " This small fish, which is extremely plentiful at particular seasons in the river Thames, is supposed to be the young of some species of the genus *Cyprinus*, though it is not agreed to what species it should be most properly referred: its general history is so well detailed by the ingenious author of the British Zoology, that it will be best given in his own words." Dr. Shaw concludes with the observations of Mr. Pennant, as above quoted.

The White-bait is introduced by Dr. Turton, as a variety of the Bleak, *Cyprinus alburnus*. He describes it as having the " Lateral

PLATE XCVIII.

line straight." The general description is to the following effect. "Pupil black; iris silvery; lower jaw longer; head, sides, and belly silvery; back tinged with green: dorsal fin nearer the head than the tail, and with about fourteen rays: tail forked, the tips black."—It will be proper to add, that in the Gmelinian *Systema Naturæ* no mention is made of this fish, and that Dr. Turton has inserted it, to all appearance, on the authority of Mr. Pennant.

Our observations commenced with stating the White-bait to be the genuine offspring of the Shad, and consequently of the Clupea, instead of Cyprinus genus, as the preceding authors consider it. This we shall have little difficulty in determining. To speak with indecision on a point that admits of not the slightest doubt is needless: when we deliver an opinion merely it is becoming to express it with diffidence; but indecision and diffidence are misapplied to matters removed beyond the possibility of doubt, and such is the fact exactly with regard to the White-bait.

Every circumstance considered, we cannot avoid concluding, that much of the prevailing errors respecting the White-bait has originated from the incautious observations of Mr. Pennant on this subject:—that this author never saw the White-bait; and that succeeding Naturalists, too implicitly relying upon his observations, have been inadvertently precipitated into those errors which the most casual examination of the fish in question would have enabled them to detect. If, however, contrary to this suggestion, Mr. Pennant ever did examine the fish, his specimens must have been either in a most imperfect state, or his investigation of it unpardonably hasty and negligent. His figure conveys no just idea of the fish, and his critical animadversions are laboriously intricate and defective. He

PLATE XCVIII.

tells us, among other particulars, that the White-bait "neither belongs to the Shad nor the Sprat, as is evident from the number of branchiostegous rays, which in those are eight, in this (the White-bait) only three." This remark is incorrect: the branchiostegous rays were uniformly eight in number in at least fifty specimens we examined, with the view of ascertaining the fact exactly. The fish represented in our Plate as just emerging above the surface of the water to seize its prey, has the gill membrane expanded, in order to render those branchiostegous rays apparent. The number of those rays determines at once that it cannot be of the *Cyprinus* genus, which is distinguished by having only three such rays, instead of eight. Mr. Pennant further remarks, that "it is impossible to class this fish with certainty;" but in what respect this ambiguity consists is not for us to say. The White-bait certainly possesses every criterion of the species, as evidently as the parent, or full grown fish. Its outline is the same, the fins are alike; it exhibits the same serrations on the abdomen, and cleft on the snout; and what is even remarkable in a fish of this small size, the lateral range of dusky spots are perceptible through the beautiful silver scales, as in the larger fish. It exhibits in a word a most perfect but diminished figure of the common shad, not a solitary character excepted.

From the above detail, we conceive there cannot remain the slightest hesitation in removing the White-bait from the *Cyprinus* to the *Clupea* genus, and restoring it to its parent species. So perfectly were we satisfied of its propriety, that having previously given a Plate of the Shad, we had been almost induced to wave inserting this little fish in the present work. Conceiving, however, on further reflection, that by introducing it to notice, with an accurate representation of the fish, in the size it is usually known by

PLATE XCVIII.

the name of White-bait, it would tend to elucidate a point hitherto considered doubtful by our Ichthyologists, we were afterwards persuaded to insert it. Any further description of the fish we presume to be unnecessary: the figures are correct, and those will sufficiently testify, on comparison with the common Shad, that the White-bait is nothing more than the young of that individual species.



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PLATE XCIX.

RAJA PASTINACEA.

STING RAY.

*** PISCES CHONDROPTERYGII.

GENERIC CHARACTER.

Spiracles ten, five on each side, oblique, and placed beneath near the neck : head small, pointed, not distinct from the breast, with the mouth beneath, transverse, and toothed : body thin, depressed, and rhombic.

SPECIFIC CHARACTER

AND

SYNONYMS.

Tail finless, and armed with a serrated spine.

RAJA PASTINACEA : cauda apterygia, aculea sagittato. *Bloch.*

Fisch. Deutschl. 3. p. 12. n. 4. t. 82.

RAJA PASTINACEA : corpore glabro, aculeo longo anterieus serrato in cauda et dorso apterygio. *Linn. Mus. Ad. Fr.* 2.

p. 51. *Arted. gen.* 71. *Syn.* 100. *Müll. prodr.*

Zool. dan. p. 37. n. 310.—*Gmel. Syst. Nat. T.* 1.

p. 3. 1509.

Raja cauda sagittata. *Baster. op. sub. sec.* 2. p. 33. t. 4. f. 5—10.

PASTINACA MARINA. *Jonst. pisc.* p. 32. t. 9. f. 7.

Pastinaca Marina nostra. *Aldr. pisc.* p. 426.

PLATE XCIX.

Gej. *Kaempfer. Jap.* p. 155.

Fire Flaire. *Ray syn. pisc.* 24.

Sting Ray. *Penn. Brit. Zool.* 3. p. 71. n. 6.

The Common Sting Ray is known by having the tail destitute of any fin, and being armed with a strong serrated spine of a bony texture. The Raja Aquila has a similar spine on the tail, but the tail itself is furnished with a fin at the tip. There are also some others of the Ray tribe that are armed in like manner with spines, but differ in other respects specifically. Gmelin admits two varieties of our Raja Pastinacea, the *Altavela* of Willughby and Ray, having two dorsal spines serrated anteriorly, and the *Uarnak* of Forskall, the body of which is spotted.—As the Sting Ray sheds its spine annually, and the new spine appears before the old one drops off, we have suspected that the *Altavela* may be only the common kind, at that precise period when both spines appear; and with respect to the *Uarnak* or spotted kind, we believe this depends only on the age of the fish, all the smaller ones we have seen having been more or less variegated with spots when first caught, and even sometimes we have observed the same in those of the largest size. The general colour of the upper surface, when perfectly fresh, is a light brown, partaking of a testaceous hue, and tinged in parts with blueish; some time after death the whole becomes more dusky. The lower surface is white. Its length in general from two to three feet.

In point of figure the Sting Ray bears some resemblance to the Skate; like that fish its skin is perfectly smooth, but the body is of a more rotundate form in the contour, and exceeds it considerably in thickness. The flesh is rank and disagreeable, so much indeed that

PLATE XCIX.

it is seldom eaten, and the capture of it an object of consideration only for the sake of the oil which may be extracted from the liver. The fishery of the Sting Ray is also attended with some danger, the sting on the tail, from whence it derives its name, being capable of inflicting a most severe wound. This formidable weapon, which the animal employs with astonishing dexterity and force against its enemies, consists of a narrow flattened spine, four, five, or six inches in length, acutely pointed and barbed along the edges, with small incurvated teeth: this sting has the texture of bone, and is remarkable for its strength. The fishermen consider the sting as highly poisonous, conceiving that at the same time it lacerates the flesh, a most malignant and acrimonious fluid is instilled into the wound. Aldrovandus, Rondelitus, Linnæus, and various other writers, entertain the same opinion; Pennant, on the contrary, denies the fact: he observes, that "this weapon of offence is capable of giving a very bad wound, and which is attended with dangerous symptoms, when it falls on a tendinous part, or on a person in bad habit of body; but as to any fish having a spine charged with actual poison, (he adds,) he must deny his assent to it, though the report is sanctioned by the name of Linnæus." We entirely coincide with Pennant, that the spine of the Sting Ray is by no means charged with any actual poison, and that the danger resulting from the wound inflicted, depends solely upon the ordinary circumstances attendant on any other wound.

This fish is mentioned by Pliny, Aristotle, and various other writers of antiquity. The ancient poets feigned that the wound of its spine was attended with the most direful effects. *Circe*, the enchantress, is said to have armed her son with a spear pointed with its spine, as the most terrible weapon she could devise, and with which he afterwards unintentionally killed his father Ulysses. It is

PLATE XCIX.

not impossible that in the invention of those fables the ancients allude indiscriminately both to this Ray and the analogous species *Aquila*, which also inhabits the seas of the South of Europe, rather than to this species individually. Pliny describes both kinds, as does likewise Aristotle, but although the characters of the two fishes were well discriminated by those early Naturalists, it is more than probable the poets were less precise, as both fishes were known to be endowed with the same kind of offensive weapon.

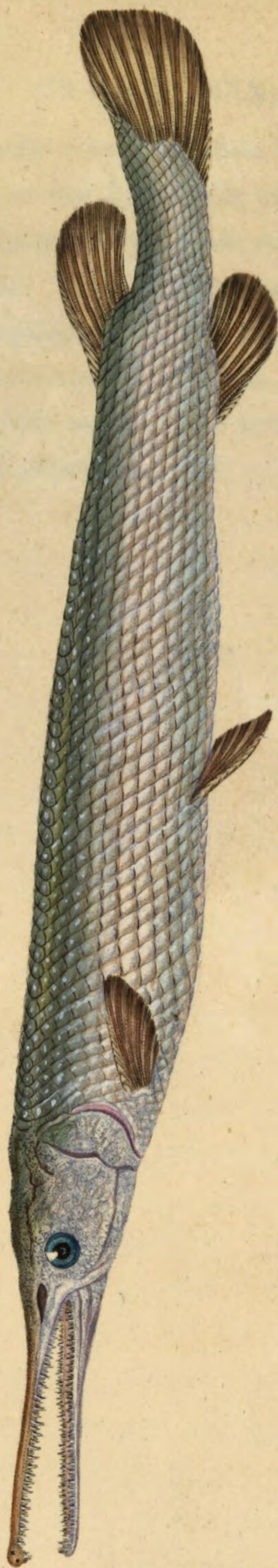


PLATE C.

ESOX OSSEUS.

OSSEOUS GAR FISH.

**** PISCES ABDOMINALES.

GENERIC CHARACTER.

Head flattish above: mouth and throat large: jaws toothed, unequal, the upper one flat, lower punctated: tongue broad, loose; palate smooth: eyes round, moderate, and lateral: nostrils double, near the eyes. Gill-covers large, aperture ample, with from seven to twelve rays. Body elongated, covered with hard scales, above convex, and compressed on the sides: lateral line straight, nearest the back, and scarcely visible: dorsal and anal fin very short, and generally placed opposite.

SPECIFIC CHARACTER

AND

SYNONYMS.

Upper jaw longer; scales osseous.

Esox Osseus: Maxilla superiore longiore, squamis osseis. *Linn.*

—*Mus. Ad. Fr.* 2. p. 101.

Esox maxilla superiore longiore, cauda quadrata. *Art. Gen.* 14.

Syn. 27.

Esox Oseus. LE CAIMAN: radiis primis serratis. *Bloch. t.* 390.

The Osseous, or Greater Gar Fish, is mentioned as a native of the British seas, by Dr. Turton, in his Gmelinian System of Nature:

PLATE C.

he informs us, after Gmelin, that it inhabits North America and Asia; and further observes, that it is rarely found on the Sussex coast. Berkenhout, in his "Outlines of Natural History," describes it previously as a British fish, on the authority, as it appears, of a single specimen, that was cast ashore upon the coast of Sussex; but whether Dr. Turton is indebted for his information to this writer or not we cannot presume to determine; the same specimen is most probably alluded to by both.—That a solitary individual at least of this species has been observed on the Sussex coast appears very certain, and having been recorded among the fishes of this country, we are unwilling to pass over such an interesting fish in silence. Should the authority upon which we have introduced it into the British Ichthyology be considered insufficient, it will be at least remembered that the ingenious Mr. Pennant has ventured on the evidence of a less positive circumstance to insert the Sword fish, *Xiphias Gladius*, in his Zoology, as a native of the British seas: the head and pectoral fins of an individual of that species being discovered some years ago on the sandy shores of Laugharn, in Caermarthenshire, induced him to admit it as such, and it must be allowed that the *Esox Osseus* has an equal claim to our consideration as a British fish.

Our figure of this curious fish is taken from a specimen of moderate size; the length from the tip of the jaws to the extremity of the tail not exceeding two feet. The form is elegant and very singular, slender in the girth, and somewhat roundish. The colour of the back pale olivaceous or greenish, becoming whiter on the sides, the belly rather more dusky than the sides, and the fins brownish. The upper jaw is rather advanced beyond the lower, a circumstance not noticed by Lister, who describes the fish, and erroneously remarks that both the jaws are of an equal length. The superior length of the upper jaw Linnaeus observes as one of the principal characters of

PLATE C.

the species: both the jaws are armed with a number of small and very acute teeth, interspersed with a few of a larger size, every third or fourth tooth being rather larger than the rest. But the species is more peculiarly distinguished by the strong osseous scales with which the whole body is covered, and protected: those are of a rhomboidal form, rather prominent in the middle, and are disposed across the body in an oblique direction. The fins are of a rounded form, and what is very remarkable, the first ray of all the fins, and in the tail, the first ray, both above and beneath, consists of small pointed bony plates, which slope obliquely one over the other, and form by that means a serrated edge. Bloch considers this as a sufficient character of the species, observing, that it differs in this particular not only from the rest of the genus, but from the whole of the fish tribe *. In our specimen the dorsal fin, which is situated close to the tail, consists of eight rays: pectoral fin of nine rays: ventral five: anal ten: and caudal eleven.

* This circumstance however, considered as a specific character, is liable to some misconception in the minds of those not well conversant with the subject, for it will not be forgotten that the anterior part of the fins of the common Sturgeon exhibits a serrated appearance very similar to that of *Esox Osseus*. In the former fish this serration is indeed occasioned by the united points of many bony rays instead of the peculiar structure of the anterior ray alone, but this is a subject rather for the critical than cursory observer, and might have been avoided. The specific distinctions assigned by Bloch are in some instances better than either those of Artedi or Linnæus, but in the present he has overlooked an obvious character adopted by the latter in search of another that may be misconceived from the latitude of his expression with regard to all other fishes.

PLATE C

the species both the jaws are armed with a number of small and very acute teeth, interspersed with a few of a larger size, every third or fourth tooth being rather larger than the rest. For the species is more peculiarly distinguished by the strong carious scales which the whole body is covered, and projected, those are of a triangular form, rather prominent in the middle, and are disposed across the body in an oblique direction. The fins are of a rounded form, and what is very remarkable, the first ray of all the fins, and in the tail the first ray, both above and beneath, consists of small pointed bony plates, which slope obliquely one over the other, and form by their union a serrated edge. Bloch considers this as a sufficient character of the species, observing that it differs in this particular not only from the rest of the genus, but from the whole of the fish tribe. In our specimen the dorsal fin, which is situated close to the tail, consists of eight rays; pectoral fin of nine rays; ventral five; anal ten; and caudal eleven.

The description of the fish is given as a guide to the reader, but it will not be forgotten that the anterior part of the body of the common Surgeon exhibits a serrated appearance very similar to that of the Surgeon. In the former fish the serration is in the form of a row of small pointed bony plates, which slope obliquely one over the other, and form by their union a serrated edge. In the latter fish the serration is in the form of a row of small pointed bony plates, which slope obliquely one over the other, and form by their union a serrated edge. In the former fish the serration is in the form of a row of small pointed bony plates, which slope obliquely one over the other, and form by their union a serrated edge. In the latter fish the serration is in the form of a row of small pointed bony plates, which slope obliquely one over the other, and form by their union a serrated edge.

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PLATE CI.

LOPHIUS PISCATORIUS.

COMMON ANGLER.

***PISCES BRANCHIOSTEGI.

GENERIC CHARACTER.

Head compressed downwards: teeth numerous and acute; tongue broad and armed with teeth: eyes vertical: nostrils small: gills three, aperture lateral and simple: pectoral fins (in most species) somewhat resembling feet: dorsal and anal fin opposite, and near the tail: body destitute of scales, and covered with a thin loose skin: vent in the middle of the body: no lateral line.

SPECIFIC CHARACTER

AND

SYNONYMS.

Body depressed: head rotundate.

LOPHIUS PISCATORIUS: depressus, capite rotundato. *Linn. Fn.*

Suec. 298.—*Müll. prodr. Zool. Dan.* p. 38. n. 321.

Lophius ore cirroso. It. scan. 327.—*Linn. Mus. Ad. Fr.* 55.

Gron. mus. 1. p. 57.

Lophius capite corpore latiore. Bloch Fisch. Deutschl. 3. p. 82.

n. 1. t. 87.—Le Diable de Mer. ib.

Rana piscatrix, &c. Borlas. Cornub. 265. t. 27. f. 3. 6.

Toad-fish, Frog-fish, Sea-Devil. *Will. Ichth.* p. 85. t. E. 1.

PLATE CI.

FISHING-FROG. *Parsons. Act. Angl.* 1764. n. 53. p. 170. t. 13.
Angler. *Brit. Zool.* 3. p. 93. 95. n. 1. 2. t. 94.

The *Lophius Piscatorius* is a fish of uncommon aspect and deformity, bearing a remote resemblance to the figure of the common frog in the tadpole state. Pliny and other Latin writers among the ancients call it *rana* and *rana marina*, in allusion to this similitude. The French, for the same reason, call it Grenouille de mer: the English fishermen the Fishing Frog, and Frog-fish; and the inhabitants of various other countries by names equally significant of its general resemblance to the tadpole of the common frog*. The English name of Angler is of modern origin, and not familiar to our fishermen: it is a name assigned to it by Mr. Pennant, in his British Zoology, and is sufficiently expressive of the very singular arts employed by this curious fish in the capture of its prey.

The head, which constitutes the greater part of the whole animal, is perfectly characteristic of the fish: this is of a roundish figure, somewhat convex above, and flat beneath: the body, which is of a size comparatively small, tapers gradually from behind the pectoral fins to the tail. The mouth is preposterously large; the lower jaw is advanced beyond the upper, and is furnished with a vast number of long, roundish and acute teeth, disposed in two or more rows, and the posterior ones are moveable; in the upper jaw are three rows of

* Belon says they further resemble the frog, affirming, that the pectoral fins of the Fishing Frog serve the animal for the purposes of feet, and that with those it walks at the bottom of the sea as the frogs do in the bogs and marshes.

PLATE CI.

teeth similar to the others. The tongue is whitish, and in one of our specimens elegantly marbled with black. The eyes, which are placed on the summit of the head, are black, and curiously radiated with white. Upon the anterior part of the head, before the eyes, are two long slender moveable filaments or tentacula, the use of which is so well described by Pliny *, in speaking of the manners of this fish, they are of a horny substance, and when complete are very long. Besides those filaments on the head, Mr. Pennant speaks of three others on the back: those latter however it should be observed are not distinct filaments like the others, but the rays of a genuine dorsal fin, being united together by a web; and which induces us to believe the specimen examined by Mr. Pennant, must have been imperfect in this particular. The whole body is covered with a thin and loose skin, which is destitute of scales, and is of a brown colour, varied with darker fuscous, and blackish; the under side white: the pectoral fins also, which are very large, are of a brown colour above and white beneath. The margin of the head and body is fringed with a number of small processes of a skin-like substance. The posterior dorsal fin is situated near the tail, and is of a brown colour; the tail blackish.

The fish seldom occurs of greater length than twenty or thirty inches, but they are said to attain to a much larger size, even to the length of five or six feet. It is a general inhabitant of the North and Mediterranean Seas, and is found, though not very commonly, on the coasts of England; towards the Scottish islands, if we are not misinformed, they are rather more abundant. As this fish swims indifferently, and cannot pursue its prey with success, like many others,

* "*Eminentia sub oculis cornicula turbato limo exerit, assultantes pisculos attrahens, donec tam prope accedant, ut assiliat.*" Plin. Lib. ix. c. 14.

PLATE CI.

it adopts a different mode of attack ; it lays itself in ambush, half covered with marine plants, or behind hillocks of sand and stones at the bottom of the water ; and in this situation throws out the long tentacula of its head, to attract the attention of the smaller fishes : those singular and useful processes from their vermicular motion, as they wave in the water, are easily mistaken for worms, which the little fishes approaching with confidence attempt to seize, and being thus enticed close to the mouth of the Fishing Frog, who laid before unperceived below, fall an easy prey to their wary enemy. The English fishermen believe this fish to be very destructive to the broods of young sharks, and under this idea, whenever they draw them up in their nets, throw them back again into the sea. The flesh of this fish is white, and having, it is said, the same flavour as the common frog, is eaten in many countries as a delicacy.

The small dorsal fin on the anterior part of the back contains three long setaceous rays, and one behind very small ; the posterior dorsal fin contains fourteen rays : pectoral fin twenty-seven rays : ventral five : anal eight ; and tail eight.

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Medicinal plant. Leaves of the plant are used for medicinal purposes. The leaves are bitter and astringent. They are used for the treatment of various ailments, including dysentery, diarrhea, and fever. The leaves are also used for the treatment of skin diseases, such as eczema and psoriasis. The leaves are used in the form of a decoction or a poultice.

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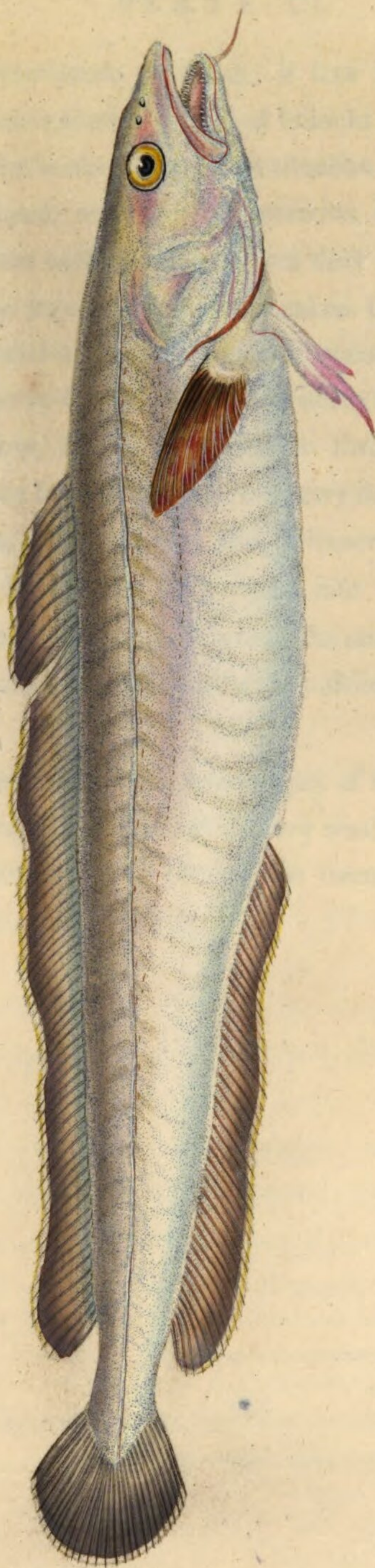
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The plant is abundant in the mountainous regions of the country. It is found in the hills and mountains of the country. It is found in the hills and mountains of the country. It is found in the hills and mountains of the country. It is found in the hills and mountains of the country. It is found in the hills and mountains of the country.



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PLATE CII.

GADUS MOLVA.

LING.

*** PISCES JUGULARES.

GENERIC CHARACTER.

Head smooth. Seven slender rays in the branchiostegous membrane. Body oblong. Scales deciduous. All the fins covered with a skin. More than one dorsal and anal fin; rays unarmed. Ventral fin slender, pointed.

SPECIFIC CHARACTER

AND

SYNONYMS.

Mouth bearded; upper jaw longest.

GADUS MOLVA: cirratus, maxilla superiore longiore. *Gmel.*

Linn. Syst. Nat. 1170.

Gadus dorso dipterygio, ore serrato, maxilla superiore longiore.

Arted. syn. 36.

Langa. *Faun. Suec.* N. 313.

Ling fische. *Belon.* 130.

Ling. *Will. Ichth.* 175.—*Raii. syn. pisc.* 56.—*Penn. Brit. Zool.*

v. 3. p. 197. 85.

The Ling is abundant in the northern seas of Europe. On the coasts of Ireland, and those of Scotland in particular, the fishery of

PLATE CII.

the Ling is considered as an extensive and lucrative concern, vast quantities of it being salted and cured for exportation, besides what is consumed fresh by the inhabitants. It appears in the southern parts of Britain only about Spring. In point of figure the Ling is not much unlike the Cod fish, but is longer in proportion; and it is from this circumstance it derives its name, Ling being only a corruption of Long, or Long fish.

The Ling exceeds the Cod fish in magnitude, growing to the length of five, six, or even seven feet; those of three or four feet in length are by no means uncommon. They feed on crabs and other crustaceous animals, and are in the highest season from the month of February till May: in June the spawning season commences, at which time it approaches the shore and deposits its eggs in moist ground, near the entrance of rivers. The colour of the Ling varies in a slight degree, according to the age and season of the fish, but in general they are paler than in the common Cod-fish: when first taken out of the water the head, back, and sides are nearly as white as the belly, but become darker from exposure to the air. The white margin of the fins is a remarkable character of this fish. In the specimen we have delineated, the first dorsal fin contains thirteen rays, the second fifty-six: pectoral fins twenty: ventral six: anal fifty-three; and the tail thirty-nine



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PLATE CIII.

RAJA MIRALETUS.

MIRROR RAY.

***** PISCES CHONDROTTERYGI.

GENERIC CHARACTER.

Spiracles ten, five on each side, oblique, and placed beneath near the neck: head small, pointed, not distinct from the breast, with the mouth beneath, transverse, and toothed: body thin, depressed, and rhombic.

SPECIFIC CHARACTER

AND

SYNONYMS.

Back and belly smooth; near the eyes aculeated, and a triple row of spines on the tail.

RAJA MIRALETUS: dorso ventreque glabris, aculeis ad oculos, ternoque eorum ordine in cauda. *Linn. Mus. Ad. Fr. 2. p. 50. Art. Gen. 72. syn. 101.—Gmel. Linn. Syst. Nat. T. 1. p. 3. p. 1507. sp. 4.*

Raja dorso dipterygio, aculeorum ordine solitario, cauda gracili pinata, ordine aculeorum terno rostro subaculeato. *Gron. Zooph. 155.*

Dasybatus in utroque dorsi latere mascula magna oculi. *Klein. miss. pisc. 3. p. 35. n. 2.*

Raja Oculata. *Jonst. pisc. t. 10. f. 4.*

Raja lævis oculata. *Will. Ichth. 72. Ray. Pisc. p. 27.*

PLATE CHH.

The specimen of this curious fish in our Museum was purchased in the London markets in the month of August, 1807. The size was that of a small Thornback, measuring about twenty-three inches from the tip of the nose to the extremity of the tail. The figure resembled the Homerling Ray, for, like that species, the whole of the upper surface was marked with roundish spots of brown upon a pale livid ground, and the tail armed with a triple series of prominent spines, those on each side being equal in point of magnitude with the others disposed along the middle. The ocellar spot in the centre of each wing was so very distinctly marked, that the fish appeared altogether a novelty, and at once struck us that it could be no other than the *Raja Miraletus* of Linnæus, a species described as a native of the Mediterranean, but not before noticed by any writer as an inhabitant of our seas. The pupil was formed by a large and very dark purple spot, encircled by a ring of shining silvery green, which inclined in some directions of light to blue, and was enclosed by a broad and dark boundary, composed of five equidistant contiguous spots of blackish purple; the whole resembling in some degree the eye of a peacock's feather.—The subject, as nearly as we could learn, was caught on the coast of Sussex.

Although we present this as the *Raja Miraletus* of Linnæus with perfect confidence, it is not without some hesitation at least, that we can offer it as a distinct species. In every respect, except the ocellar spot on the wings, it perfectly agrees with the Homerling Ray, and may possibly prove, on further examination of other specimens, to be only a *lusus*, or remarkable variety of that fish. We have certainly seen vast numbers of the Homerling without ever once observing any mark similar to this upon them, but the same character has occurred to our notice in another species of Ray, the com-

PLATE CIII.

mon Skate.—Our suspicions of its not being a genuine species were first excited by perceiving among a number of the Skate of various sizes, several of the smaller ones marked exactly in the same manner. They were evidently Skate from their general figure, from the larger spines on the tail being disposed down the middle in a single series, and the uniform blackness of the lower surface, the dingy aspect of which is assumed from the innumerable small black specks with which the skin in that part is dotted. A large Skate afterwards occurred, in which the same annular mark was very observable; and from that time for some years past becoming more attentive to this circumstance, we have perceived it in the Skate more or less conspicuous in every stage of growth. This we believe has not been hitherto mentioned by writers; the fact is, however, certain, and clearly proves that those ocellated spots are not peculiar to *Raja Miraletus*, and consequently insufficient to prove it a species.—In every other respect, as before observed, it agrees with the Homerling, and upon the whole may prove, as already suggested, to be only a variety of that species. It is certainly a very remarkable and curious fish, whether it be a variety, or a species, and highly worthy of a place in the present work.

1875

1876

1877

1878

1879

Received of the Treasurer of the
Board of Directors, the sum of
Twenty Dollars, for the year
ending 1879.

Witness my hand and seal
this 1st day of January, 1880.

Attest:
Secretary.

James H. Smith, President.
J. H. Smith, Secretary.
J. H. Smith, Treasurer.

James H. Smith, President.
J. H. Smith, Secretary.

James H. Smith, President.
J. H. Smith, Secretary.

James H. Smith, President.
J. H. Smith, Secretary.



PLATE CIV,

GOBIUS NIGER,

BLACK GOBY.

***PISCES THORACICI.

GENERIC CHARACTER.

Head small. Eyes placed nearly together, with two pores between them. Gill-membrane, with four rays. Body small, compressed at both sides, and covered with small scales; behind the vent a tubercle. Ventral fins united into the form of a funnel. Dorsal fins two.

SPECIFIC CHARACTER

AND

SYNONYMS.

Varied: white and fuscous: second dorsal fin with about fourteen rays.

GOBIUS NIGER: ex albo et fusco varius, pinna dorsali secunda radiis xiv. *Bloch. Fisch. Deutsch. 2. p. 5. t. 38. f. 1, 2, 5.*

GOBIUS NIGER: pinna dorsali secunda radiis quatuor decim. *Mus. Ad. Fr. 2. p. 64.—Gmel. Linn. Syst. Nat. T. I. p. 3. p. 1196.*

Eleotris capite catheto plateo, pinnis ventralibus concretis. *Gronov. Zooph. No. 281?*

Gobius Niger, Sea Gudgeon, Rock fish. *Will. Ichth. 206.—Raii syn. pisc. 76.*

BOULEREAU, or Gougeon de Mer. *Lacepede, &c.*

BLACK GOBY. *Penn. Brit. Zool. v. 3. p. 213. 21.*

PLATE CIV.

This little fish is not entirely of a black colour, as its trivial appellation may imply; the ground colour is dusky above, beneath white, and the whole of the upper part and sides varied with pale testaceous, dark streaks, and spots of black; the head and darker parts glossed with blueish, and the fins partaking of the same colour. In the first dorsal fin of our specimen are seven rays, in the second twelve, pectoral eighteen, ventral eight, anal twelve; and caudal sixteen. The rays of all the fins are spotted with black. One peculiarity in the structure of the ventral fins should be observed; these unite and form a kind of funnel, by means of which this fish affixes itself so firmly to the rocks as to require some force in removing it, and has hence acquired the synonymous title of rock fish.

The Black Goby seldom exceeds the length of five or six inches; it is of the voracious kind, preying on smaller fishes and aquatic insects. Except in the spawning season it remains in the sea; about May or June it ascends rivers for the purpose of depositing its spawn, which it generally secretes under stones near the shallows, and then returns again to the marine element. The Black Goby is taken in great abundance in the North Seas, and is esteemed delicate and wholesome as an article of food. Upon the coast of France this fish appears to be very common, but we have reason to apprehend that it cannot be frequent in the vicinity of the British shores. Our specimen is from the coast of Devonshire.



PLATE CV.

CEPOLA RUBESCENS.

RUBESCENT BAND-FISH.

*** PISCES THORACICI.

GENERIC CHARACTER.

Head subrotund and compressed: teeth curved, and usually in a single row: gill-membrane with about six rays: body ensiform, naked: abdomen scarcely the length of the head.

SPECIFIC CHARACTER.

Rubescens: caudal fin tapering: jaws pointed.

CEPOLA RUBESCENS. Rubescens, pinnæ caudæ attenuata, maxillis acutis.

CEPOLA RUBESCENS: pinna caudæ attenuata maxillis acutis. *Mus. Ad. Fr. 2. p. 63.*

Ophidium macrophthalmum. *Linn. Syst. Nat. X. 1. p. 259.*

Taenia serpens rubescens dicta. *Art. Syn. 115?*

Encheloyopus totus pallide rubent, in imo ventre albescens, &c.

Klein. miss. pisc. 14. p. 57. n. 10?

Taenia rubra. *Will. Ichth. p. 117.—Raj. pisc. p. 71. n. 10.*

Cepola rubescens. *Mont. Linn. Trans. v. 7. p. 291.*

An interesting account of this beautiful and curious species appears in a paper written by G. Montagu, Esq. in the seventh volume of

PLATE CV.

the Linnæan Transactions, accompanied by a coloured representation of the fish in its natural size. The specimen from which the description and figure were taken, was caught in Salcomb Bay, on the south coast of Devonshire, on the 25th of February, 1803; and since that period another was captured in the same place, which Mr. Montagu has kindly favoured us with for the purpose of investigation, and with permission to delineate in the present work.—We deem it a species of considerable rarity, and are happy in being enabled to present it to our readers.

The specimen first caught, and described in the Linnæan Transactions, is supposed to be a female; it measured ten inches in length, the depth behind the head rather more than three quarters of an inch, and the breadth half an inch. The colour pale carmine, darkest above and towards the tail: the gill-plates and undulated transverse lines along the sides silvery, and the fins the same colour as the body, except the ventral, which are nearly white. That which we have figured (presumed to be the male) is eleven inches in length, not quite so deep, and rather of a darker colour.

From the observations of Mr. Montagu, in the paper above-mentioned, it is obvious he considers the *Cepola rubescens* to be altogether a different species from *Cepola Tænia*; while Gmelin, on the contrary, thinks the *rubescens* may be only a variety of the other kind.—We must confess ourselves not entirely satisfied whether it ought to be admitted as a distinct species, or a variety; for it appears to us that the precise characters of the two fishes are not at present distinctly understood;—it certainly still remains a point on which a difference of opinion may be maintained.

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If the definition of the two fishes are inexplicit, the *Cepolæ* figured by Rondeletius, Gesner, and Jonston are likewise to be consulted with caution. By late writers these are referred to the species *Tænia*; should this be correct, we must express our doubt how far they are authorized in placing the *Tænia rubra* of Ray and Willoughby, and the *Enchelyopus* of Klein, with the same species. The latter we suspect to be the *Cepola rubescens*, and think ought rather to be placed with the “*Tænia serpens rubescens dicta*” of Artedi than as synonymous with *Cepola Tænia*.—The *Cepola rubescens* is described in the tenth edition of the Linnæan *Systema* under the appellation of “*Ophidion macrophthalmum, maxillis imberbibus pinna caudæ acuminata.*” In the last edition of that work the description is different; it occurs in the new genus *Cepola* under the specific name *rubescens*, and is thus described: “*pinna caudæ attenuata maxillis acutis;*”—the *Cepola Tænia*, to which it is so closely allied, appears under the character of “*pinna caudæ attenuata maxillis acutis.*”

Bloch seems to be the first writer who describes the *Cepola* with accuracy, and he only speaks of one species, the *Cepola Tænia*, the description of which very nearly corresponds with our *rubescens*, and would almost incline us to believe them both the same species. In the first place, according to this writer, *Cepola Tænia* is known by having the head truncated in front; Gmelin says it is very obtuse, while that of *rubescens* has the jaws sharp-pointed. This being regarded as the most material character, deserves attention.—The figure of the head in Bloch, though obtuse, does not deserve the appellation of *obtusissima*, neither are the jaws of the fish before us so pointed as to accord with that of *acuminata*; it is in a very slight degree of a more lengthened form than the figure of Bloch represents;

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the difference is scarcely perceptible, and the head is so much flattened in front as to be really truncated; in this respect, therefore, so far as we can judge, the two fishes are not very, if at all, different. According to the Gmelinian Systema, this is the only distinction between the two fishes; for although he mentions, besides this, the form of the caudal fin, he describes it as being attenuated in both species, and which consequently therefore ceases to be a decisive character of either.

“Gmelin (says Mr. Montagu) is inclined to think the *Cepola rubescens* a variety of the *Cepola Tænia*, but that is out of all question, as the body of this species is not carinated on each side, nor has the lower jaw a double row of teeth; and in other respects it differs.” These observations are worthy of further consideration. The most material objection arises from a supposed difference with regard to the sides of the two fishes, those of the *Cepola Tænia* being conceived to be carinated, while in *rubescens* the sides are perfectly smooth.

This conclusion is not correct, and the error seems to originate with Gmelin, who in his general description of the *Cepola Tænia* employs the terms, “*utrinque carinata*,” from which it may be inferred, that the fish is carinated at the sides, in the literal acceptance of the words, but this is not the fact; what is usually understood by the sides, being depressed instead of carinated. Bloch, from whom Gmelin evidently takes his description, affords a satisfactory explanation on this point. “Le tronc (says this author) est terminé en tranchant à sa partie supérieure et inférieure. Les côtés sont fort comprimés, et se rétrécissent en approchant de la queue.” The true character of the carination is thus unequivocally explained: it is not the middle of the sides which is carinated, that part being

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compressed, but their extreme edges above and beneath, occasioned by the upper and lower part of the fish being slightly flattened, and appearing somewhat truncated. This character, observable in *Cepola Tænia*, is equally obvious in *rubescens*, and may be at once perceived when the dorsal and anal fins are expanded. The commencement even of the carinations along the upper part begins before the dorsal fin, taking their rise from the back of the head in an oblique course, gradually approximating towards the first ray of the dorsal fin, and thence continuing pretty near the base of that fin at each side throughout the whole length of the fish. The carinations beneath are likewise contiguous, and run close to the base of the anal fin on each side.—The last difference alluded to, consists in the number of the teeth; those in *Cepola rubescens* constituting only a single series in each jaw, while in *Cepola Tænia* the lower jaw has a double series. We cannot surely admit this as an absolute distinction, when it is remembered, that the number of teeth increases in many fishes as they advance in age; and that the lower jaw of our *C. rubescens* presents a broader space than the upper; it is possible the latter may have more than one row of teeth when full grown, and that our fish has not yet attained to perfect maturity.

Every circumstance considered, it will be allowed that neither of the above characters are sufficient to authorise us in forming two species of *C. Tænia* and *C. rubescens*; the characters proposed accord with both. We are still, inclined to allow that the difference between the colour of the two fishes is very remarkable; and that, should the delineation of *Cepola Tænia* given by Bloch be correct in all respects, we ought not too hastily decide on their being of the

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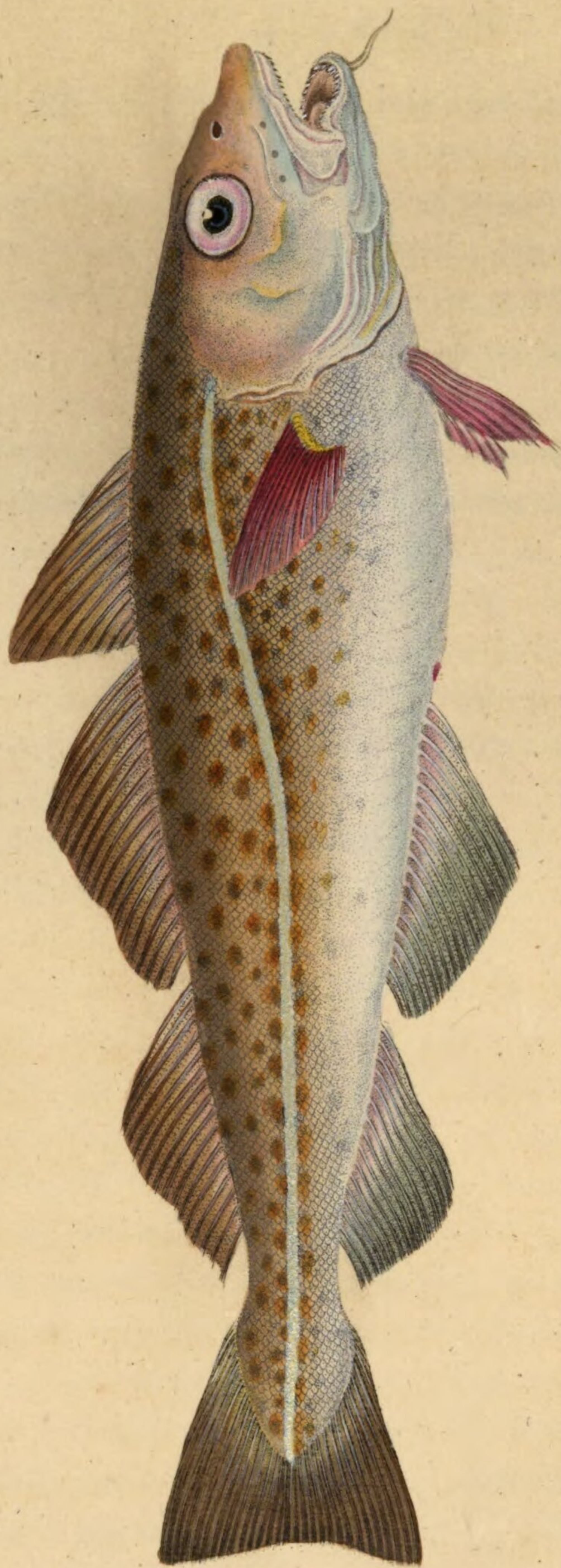
same species. His figure represents the fish of a silvery grey colour with the fins red, and several equidistant spots or patches of red on the cheeks, and along the side below the lateral line: his description accords with this, and so far deviates very materially from *C. rubescens*, which is throughout of a pale carmine colour, and entirely destitute of those remarkable spots so conspicuous in the above-mentioned figure.—This is a strong character, but still insufficient to induce us at once to pronounce them different; the colours of some fishes are extremely fugitive and variable; the young of various kinds are decorated with spots, which disappear in the adult state; and again in others, spots and marks appear in the fish at maturity, which in the younger state are invisible; as is abundantly proved in many instances of the Salmon tribe. Sometimes likewise it is the criterion of a sexual difference, as in the *Torpedo*, a young male of which, in our possession, exhibits those characteristic marks in the most singular manner. In the figure of *Cepola Tænia*, given by Bloch, the tips of the rays of both the anal and dorsal fin are bifurcated, while in our fish they appear single; and this we imagined to be a striking character, till on expanding the fins of our fish they proved to be bifurcated likewise. We should observe, that both those fins in our fish are very entire, while in Bloch's figure the edges of them appear to have sustained some injury, as the tips of the rays extend much beyond the connecting membrane.—Mr. Montagu thinks the two fishes he has met with male and female; could this be determined, it would remove from our own minds a strong suspicion that the *Tænia* and *rubescens* are in reality only the two sexes of the same species. If we admit them as distinct species we have more reliance on the difference of their colours than any other character the two fishes appear to exhibit; and this, upon the whole, inclines us to believe they may be distinct.

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We have only to add our regret, that the *Cepola Tænia* of Bloch has never fallen under our own observation, and that our inferences are for this reason necessarily drawn from figures and descriptions, which, however correct, are not sufficiently satisfactory to inspire confidence, and authorise us in determining whether the two fishes are specifically distinct or not.

In the specimen of *Cepola rubescens* now before us, the dorsal fin contains seventy rays: pectoral twelve; ventral six: anal sixty-nine; and tail nine,

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PLATE CVI.

GADUS MORHUA.

COD-FISH.

** PISCES JUGULARES.

GENERIC CHARACTER.

Head smooth. Seven slender rays in the branchiostegous membrane. Body oblong. Scales deciduous. All the fins covered with a skin. More than one dorsal and anal fin; rays unarmed. Ventral fin slender; pointed.

SPECIFIC CHARACTER

AND

SYNONYMS.

Scales large: first ray of the ventral fin spiny.

GADUS MORHUA: squamis majoribus: radio primo anali spinoso.

GADUS MORHUA: cauda subæquali, radio primo anali spinoso.

Linn. Fn. Suec.—Gmel. Linn. Syst. Nat. T. 3.

p. 1. p. 1162. sp. 3.

Gadus dorso tripterygio, ore cirrato, cauda æquali fere cum radio primo spinoso. *Art. syn. 35.*

Callarias sordide olivaceus: maculis flavicantibus variis, linea laterali alba. *Klein. Miss. pisc. 5. p. 5. n. 1.*

Cabliau. *Ström. söndm. 317.*

COD-FISH. *Will. Ichth. p. 165.—Raj. pisc. p. 53. n. 1.—Penn: Brit. Zool. 3. p. 172. n. 73.*

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The history of the common Cod-fish is amply detailed by many writers. It is known to be a general inhabitant of all the Northern and American seas, and is found in very high latitudes, though in less abundance and perfection than in regions somewhat more temperate. The great resort of the Cod-fish are the immense sand-banks on the coast of Newfoundland, and others off the coasts of Cape Breton, Nova Scotia, and New England; and also upon those of Iceland and Norway, the Dogger Bank, and the Western Isles.

Before the discovery of Newfoundland, the principal fisheries for the Cod were carried on upon the coasts of Iceland and the Scottish islands, which were then the places of rendezvous for all commercial nations engaged in those concerns. In the year 1388 the city of Amsterdam received permission from the Crown of Sweden to form an establishment upon the isle of Schonen for the fishery of the Cod in the adjacent seas. The English resorted to Iceland for the purpose of fishing before the year 1415, as it is recorded that Henry the Fifth of England was disposed to give the King of Denmark satisfaction for certain irregularities committed in those seas by his subjects. Under Edward the Fourth the English were excluded by treaty from this fishery, under pain of death, and confiscation of property; notwithstanding which Mr. Pennant observes, that monarch gave licence to a ship of Hull to sail to Iceland, and there relade fish and other goods, without regard to any restrictions to the contrary. In later times, Queen Elizabeth condescended to ask permission to fish in those seas from Christian the Fourth, King of Denmark; though it appears she afterwards repented her request, and instructed her ambassador at that court to insist on the right of a free and universal fishery. The issue of this application is uncertain,

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but her successor, James, having espoused a princess of Denmark, the English were afterwards permitted to fish in those seas without molestation.

In a commercial view, the importance of the Cod fishery is very great; as an object of national consequence to a maritime country like Great Britain, its advantages are peculiar, and of still greater moment; the fish itself being an article of trade for the benefit of individual adventurers, the fishery a nursery of seamen for the state. The consumption of this fish in the British Isles is less considerable, except in the remoter parts of Scotland, than in Iceland, Norway, and some other northern countries, in many parts of which it constitutes a principal article of food. The English, from their hardy intrepidity and industry, hold a great share of this fishery in their own power; the Dutch, French, Spaniards, and Portuguese, also, except in time of war, take an active share in this concern.

The fisheries for Cod are carried on at all seasons of the year on the coasts of Norway, some parts of America, and also on the British shores, chiefly about the Orkneys and Western Isles, from whence they are brought alive in well-boats, or packed up fresh in ice, for the supply of the London, and other markets. This fish commonly inhabits the deeps of the open sea, where it subsists on sea polypes, and other worms: fish, of which the herring is the principal; crabs, and testaceous animals, or shell fish. In the spawning season it seeks the sand-banks, in order to deposit its spawn, and it is at that season the fishery proves most productive. The fishermen observe, that the time of spawning varies according to the age of the fish, or the greater or less degree of cold. In England they

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usually begin spawning about January, in Iceland about February, and on the banks of Newfoundland not till April. The greatest fishery for the Cod in Europe is therefore from the month of February to the end of March, or middle of April, but in America in May and June. They disappear after this time, and again return to their former haunts in September, at which time, however, the severity of the northern winters begin to take place, and when the waters become frozen the fishery is altogether precarious. The Cod-fish is taken by the hook and line, baited with pieces of fish, aquatic birds, clamps, or other food upon which this fish in common subsists.

The mode of preparation adopted by different companies and nations for the curing the Cod-fish is various: in the north they distinguish different kinds by the name of *Stock-fish*, *Laberdan*, *Klipp-fish*, &c. the principal difference of which consists in preparing the flesh with a greater or less portion of salt, and in either drying it in the air, or preserving it moist, packed up in barrels. The sounds are considered delicate, and it need be scarcely added that an isinglass is prepared from this part of the fish. An oil is likewise extracted from the liver of the Cod by the Norwegians and Icelanders, which for many useful purposes is preferable to that of the whale.

It is rarely that the Cod-fish attains to a large size in the British seas. Mr. Pennant speaks of one which measured five feet in length, and five in the girth round the shoulders; the weight seventy-eight pounds: this was taken on the coast of Scarborough, in Yorkshire. Those of twenty or thirty pounds weight are esteemed of good size in England; but they occur of far greater magnitude on the coast of Newfoundland.

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The colour of the Cod-fish varies at different ages, or states of growth, and according to the climate. The general hues are cinereous on the upper parts, and white beneath, and when young, are varied with yellowish marks, which become more obscure in the full-grown fish. In vigorous healthy fishes the colours are remarkable vivid and beautiful. The first dorsal fin contains about twelve rays, the second eighteen, and the third sixteen: the pectoral fin fourteen, ventral seven: the first anal fin twenty, second sixteen: and tail thirty-six.

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The colour of the Cod-fish varies at different ages, or stages of growth, and according to the climate. The general hues are the same on the upper parts, and white beneath, and when young, are marked with yellowish marks, which become more obscure in the full-grown fish. In vigorous healthy fishes the colours are remarkable vivid and beautiful. The first dorsal fin contains about twelve rays, the second eighteen, and the third sixteen: the pectoral fin contains twenty-seven: the first anal fin twenty, second sixteen: and tail thirty-two.

and has numerous small scales by which it is covered. The scales are small, and set close together, and are of a silvery white colour, and are marked with yellowish spots. The scales are small, and set close together, and are of a silvery white colour, and are marked with yellowish spots.

It is a very common fish, and is found in all the seas. It is a very common fish, and is found in all the seas. It is a very common fish, and is found in all the seas.

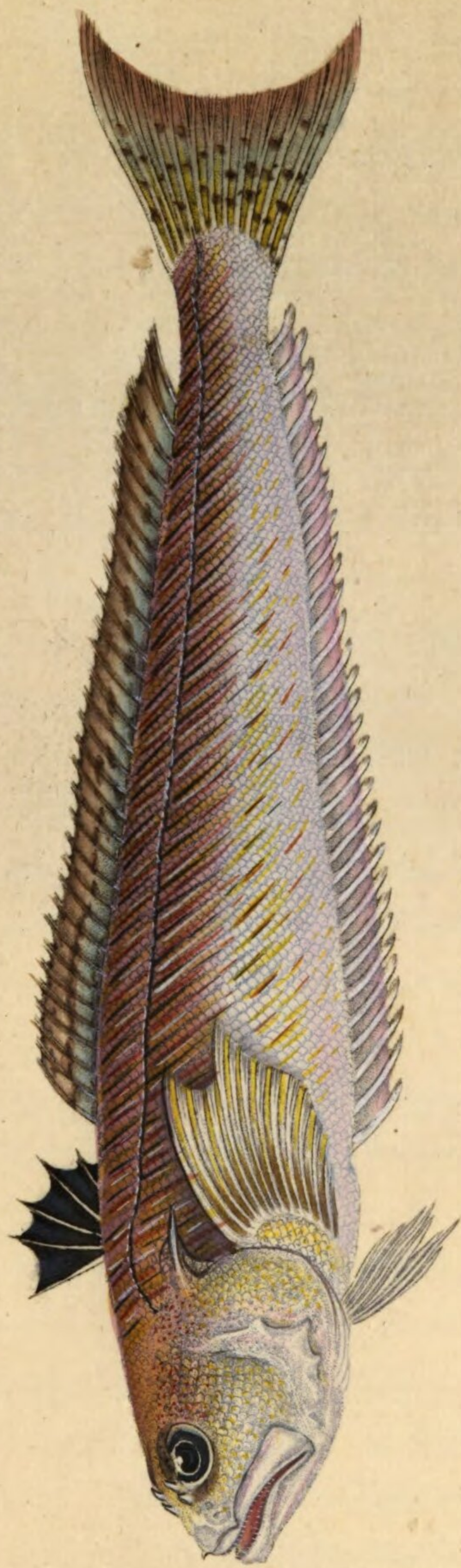


PLATE CVII.

TRACHINUS MAJOR.

GREATER WEEVER, or STING-BULL.

** PISCES JUGULARES.

GENERIC CHARACTER.

Head smooth, compressed: branchiostegous membrane with six rays: inferior lamina of the gill-covers, serrated. Vent near the breast,

SPECIFIC CHARACTER

AND

SYNONYMS.

Front of the head sloping downwards, and armed with two prominent spines before the eyes: pectoral fin emarginate at the tip.

TRACHINUS MAJOR: fronte declivi ante oculos bispinato, pinna pectorali apice emarginata.

Draco Major seu araneus. *Salvian.* 70.

GREATER WEEVER. *Penn. Tour Scotland.* 1769. *Octavo.*

Great Weever. *Penn. Brit. Zool. T. 3. p. 171.*

This particular species is very generally confounded with the common, or small Weever, *Trachinus Draco*. Some few writers, among

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whom are Salvianus and Pennant, have avoided this mistake, and described them as two species; while Linnæus, Bloch, Gmelin, and others, consider the Greater Weever only as a larger growth of the other kind. Dr. Shaw is of the latter opinion: "It is maintained by some Ichthyologists," says this writer, "that there are in reality two kinds of this fish, namely, the Greater and Smaller Weever; but the difference, if any, seems to consist merely in size, and a slight variation in colour."—These conclusions are, however, erroneous, and have, we suspect, originated rather from consulting the contradictory reports of authors, than an actual inspection of specimens. At different periods we have met with three examples of the larger Weever, two of which are preserved in our Museum; and these exhibit characters so obviously distinct from *Trachinus Draco* that we cannot hesitate in considering it as a very different species.

The dissimilarity which prevails between those fishes is apparent at the first view: independently of a difference in size, which we must regard as no criterion of a species, the smaller Weever is of an obtuse form in front, and sloping, suddenly from the anterior part to the tail; the greater Weever is of a more elongated figure, and somewhat tapering towards the front. In the smaller Weever the mouth ascends in a remarkable manner, insomuch that the upper lip, and also the extremity of the lower jaw, when the mouth is closed, stands in a direct line with the upper part of the back; and in the great Weever, on the contrary, the front of the head slopes downwards. The space before the eyes of the smaller Weever is smooth, or only slightly tuberculated, while in the other that part is armed with four conspicuous sub-incurvate spines, two of which are placed obliquely in front of each eye; and lastly, the pectoral fins, which are entire in the smaller Weever, are very deeply emarginated in the other.

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These are not to be considered as characters of slight importance, since either would be sufficient to constitute a specific distinction between the two fishes. We might also advert to the dissimilarity of their colours, but we are inclined to regard their difference in this respect only in a secondary point of view.

Mr. Pennant is the first, and almost only writer, who affords a correct idea of this species: he does not indeed point out any precise character, by means of which the two species may be clearly distinguished; but from the description and figure annexed, the fish he describes is evidently of this kind: the remarkable declivity of the head before the eyes is tolerably well represented, as are also the spines in that part, the position of the mouth, and the lines of black marks and dots disposed obliquely on the back and sides; the character of the pectoral fin is, however, misrepresented, appearing of a rounded form instead of being emarginate.

The Great Weever is usually from ten to twelve inches in length, the head sloping, and somewhat tapering towards the front, and covered with small scales; the gill-covers armed with a strong spine behind. The scales on the body are disposed in oblique lines from the back to the belly; the back brownish, marked in the same direction as the scales, with interrupted parallel lines of yellow, interspersed with others of black, the sides and abdomen white, with interrupted yellow lines. The first dorsal fin, as in the Smaller Weever, contains five rays, connected by a web of a deep black colour, and is reputed venomous: the second dorsal fin contains thirty-two rays, and is spotted with brown: in the pectoral fin are fourteen rays: ventral five rays: anal thirty-two: and caudal thirteen.

According to Mr. Pennant, this fish inhabits the sea near Scarborough: they are occasionally brought in the spring to the London

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markets, being in some esteem for the table, but those exposed for sale are generally in a mutilated state, being deprived as soon as taken by the fishermen of the first dorsal fin, and the strong spine at the posterior part of the gill-covers.

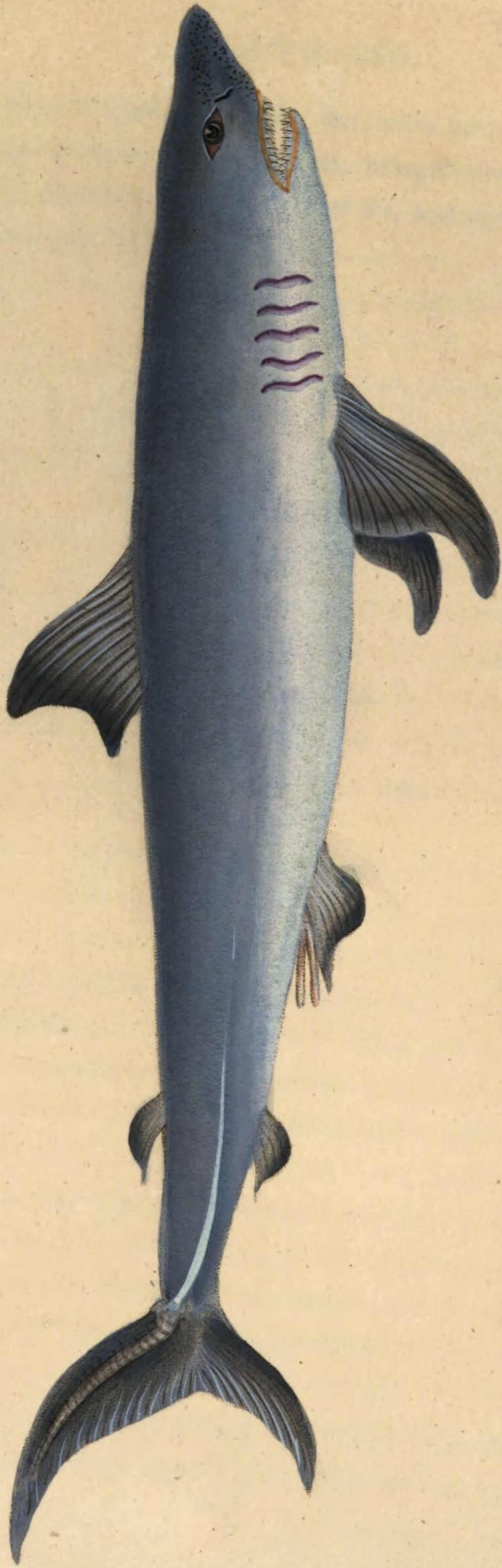


PLATE CVIII.

SQUALUS CORNUBICUS.

PORBEAGLE SHARK.

***** PISCES CHONDROPTERIGII.

GENERIC CHARACTER.

Head obtuse. Spiracles four to seven, placed on the side of the neck, and semilunar. Eyes oblong, vertical, half covered, and situated before the temporal orifices. Mouth beneath, in the anterior part of the head: teeth numerous, serrated, acute, partly moveable, partly fixed, and unequal. Body oblong, roundish, and rough, with tender prickles. Ventral fins for the most part smaller than the pectoral, approximate; and situated near the vent, or genitalia, in the males.

SPECIFIC CHARACTER

AND

SYNONYMS.

Snout projecting, conic, and porous each side: posterior part of the body depressed, and angulated.

SQUALUS CORNUBICUS: rostro prominente conico, lateribus minute perforato, corpore postice depresso angulato.

SQUALUS CORNUBICUS: plica longitudinali ad utrumque caudæ latus. *Gmel. Linn. Syst. Nat. T. 1. p. 3. 1497.*

Squale nez. *Brousson. Act. Paris. 1780. p. 667. n. 16.*

Porbeagle. *Borlas. Cornub. 265. t. 26. n. 4.*

Porbeagle. *Penn. Brit. Zool. v. 3. p. 117. n. 49.*

Beaumaris Shark. *Penn. Brit. Zool. v. 3. p. 118. n. 50. Linn.*

Trans. v. 3.

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There is every reason to apprehend, that the first account of this species of Shark extant, is to be found in that well-known work the *Natural History of Cornwall*, by Dr. Borlase, where it occurs under the title of the Porbeagle. The notice of the species is extremely concise, but is accompanied with a tolerable figure of the animal, engraved after a drawing by the Rev. Mr. Jago, minister of Loo, in that county, in the time of Ray.

The description of the Porbeagle in Mr. Pennant's work is taken from Dr. Borlase's figure, and is so far pretty correct. Gmelin describes the Porbeagle under the specific name of *Cornubicus*, referring for authorities to the works of Dr. Borlase, Pennant, and also the paper in the Parisian Transactions, by Broussonet, treating of the *Squale nez*, which he considers to be of the same kind. One of the latest and best accounts of the fish is from the pen of Dr. Goodenough, Bishop of Carlisle, who describes a specimen, found on the coast of Hastings in 1803, with considerable accuracy, in the third volume of the Transactions of the Linnæan Society. The individual mentioned had been landed four hours when Dr. Goodenough first saw it, and then weighed twenty-six pounds: the body, from the tip of the nose to the extremity of the tail, was three feet ten inches; the colour on the back deep blue, and silvery white beneath. The nose was projecting and sharp, and on both sides from the nose to the eyes were many minute perforations or pores. The general shape of the body was roundish, except for about six inches from the tail, where it was depressed, and formed an angle or elevated line on each side. The teeth vary in number, according to the age of the fish, specimens being found with one, two, or even three rows, when the animal attains to a large size.

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The ample account Dr. Goodenough affords, agrees with our specimen, which measures nearly four feet in length, and possesses a triple series of long acute teeth in each jaw. Beside this example, which we procured in a recent state, the head of another, of larger size, is preserved in our Museum: the animal to which the latter belonged must have been about five feet in length, as nearly as can be estimated. Those are the only specimens we have seen, and hence we must conclude that it cannot be a very common fish on our coasts. From the structure of its teeth it is supposed to be of the voracious kind of Sharks; its food is uncertain, for upon opening the stomach of our recent fish, that part was observed to be empty; the same circumstance was remarked likewise upon opening that examined at Hastings, as above mentioned. The fins of this Shark are rather large, that of the tail especially, which is of a semi-lunar form, with the upper lobe or horn longer than the lower one *.

From a reference to our synonyms it will be seen, that the Porbeagle and Beaumaris Shark are considered by us as the same animal, contrary to the opinion generally prevalent with naturalists, and the testimony of Mr. Pennant. Gmelin is an exception, for he makes the Beaumaris Shark a variety of the other, though on what autho-

* In the description of the Beaumaris Shark, lately published by Dr. Shaw, it is stated, that "in the British Zoology, the upper lobe of the tail is said to be ten, and the lower thirteen inches long, but it is clear, from the plate engraved from Mr. Davies's drawing, this is an error." Vide *Gen. Zool.*—There appears to be some oversight in this remark on the part of the last-mentioned ingenious writer instead of Mr. Pennant; for it will be seen, on reconsulting the description in the British Zoology, that the upper horn of the tail is "*one foot ten inches*, and the lower *one foot one*," which agrees exactly with the figure of the tail in the drawing.

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rity we cannot pretend to determine*. The suspicions of Gmelin on this subject are not altogether unfounded, though it must be remarked, that it is not exactly a variety of that species, but precisely the same fish.—This we are at liberty to state on the best authority, having been favoured some years ago by the Rev. Mr. Hugh Davies, of Beaumaris (the gentleman from whom Mr. Pennant acknowledges to have derived his information of the fish) with the original drawing and description from whence the account of the Beaumaris Shark in the British Zoology was taken†. This drawing was liberally put into our hands by Mr. Davies, with permission to employ it in any manner likely to promote science; and we cannot therefore consistently pass over it without offering some further observations respecting it. From a slight comparison there appears sufficient reason to regret, that a very striking dissimilarity prevails between the plate in the above work and the original drawing from whence it professes to be copied, the figure in the plate having been injudiciously altered to the fancy of the artist, or the engraver, to give the animal a better contour. By this means the accuracy of the first design is entirely lost, and the deviation rendered considerable; insomuch indeed as to convey an idea of a very distinct fish, and thus involve the history of the species itself in obscurity. Dr. Goodenough is among the number of those misled by an implicit reliance on the plate in the British Zoology; for he observes (depending on the accuracy of the drawing) that his fish, (*Squalus Cornubicus*,) cannot be the same as the

* Dr. Turton, contrary to the example of his author, makes two distinct species of those fishes in his translation of the *Systema Naturæ*.

† “*Beaumaris Shark*. This species was observed by my friend the Rev. Mr. Hugh Davies, of *Beaumaris*, who favoured me with the description, and an accurate drawing made from the fish taken in a neighbouring wear,” *Penn, Brit, Zool*, V. 3. p. 128, n. 50.

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Beaumaris Shark, as the first has a blunt nose, the Cornubicus a sharp one. In the original drawing the nose is sharp, and the whole body of a much more slender figure than the engraving represents. —There is in fact not the slightest difference between the original drawing of the Beaumaris Shark by Mr. Davies, and the *Squalus Cornubicus*;—they are both of the same species.



PLATE CIX.

ESOX LUCIUS.

PIKE.

**** PISCES ABDOMINALES.

GENERIC CHARACTER.

Head flattish above: mouth and throat large: jaws toothed: unequal, the upper one flat, lower punctated: tongue broad, loose: palate smooth: eyes round, moderate size, and lateral: nostrils double near the eyes. Gill-covers large, aperture ample, with from seven to twelve rays. Body elongated, covered with hard scales, above convex, and compressed on the sides: lateral line straight, nearest the back, and scarcely visible: dorsal and anal fin very short, and placed opposite.

SPECIFIC CHARACTER

AND

SYNONYMS.

Snout depressed, jaws nearly equal.

Essox Lucius: rostro depresso subæquali. *Linn. Fn. Suec.* 355.

Gmel. Linn. Syst. Nat. T. 4. p. 3. p. 1390.

Essox rostro plagio plateo. *Art. Gen. syn.* 10. *syn.* 26. *spec.* 53.

Lucius. *Rondel. pisc.* p. 188.

Gesn. aq. p. 500.

Auson. Mos. p. 122.

PLATE CIX.

Pike. *Will. Icth.* p. 236.

Raij pisc. p. 112.

Penn. Brit. Zool. 3. p. 270. n. 1.

The Pike inhabits lakes and other still waters in Europe and the northern parts of Asia. It is a strong, fierce, and active fish, swims with great rapidity, grows fast, and preys on reptiles, water rats, the young of aquatic birds, and various other animals. The Pike commits vast depredations in fish-ponds, being extremely voracious, and devouring all kinds of fishes, its own species not excepted. The greatest enemies of the Pike are the Perch and the Stickleback, both of which are armed with formidable spines, well calculated for defence, and sufficiently powerful to intimidate the Pike.

The precise period of its introduction into Britain is not ascertained; it must have been naturalized here before the middle of the fifteenth century, as Pikes were served up in plenty at the celebrated feast given by George Nevil, Archbishop of York, in the year 1466. According to a popular but evidently erroneous opinion, the Pike was not brought into England till the reign of Henry the Eighth. Some parts of the south of Europe are still destitute of this fish, for, if we may rely on the assurance of Amatus, it is neither to be found at present in Spain nor Portugal.

This fish attains to a large size in a shorter time in proportion than most others. In the course of the first year it grows to the length of eight or ten inches, the second to twelve or fourteen, the third to eighteen or twenty. Willoughby speaks of one weighing thirty-two pounds: the largest Mr. Pennant heard of in England weighed thirty-

PLATE CIX.

five pounds. Another, weighing forty-three pounds, was taken in 1752 near Dresden. Dr. Brand saw one seven feet in length taken near Berlin. But the largest of these are still inferior in size to those found in the Lapland Lakes, and in the river Wolga in Russia. Pliny speaks of the Pike weighing nearly a thousand pounds. The largest recorded by later writers within our knowledge was that taken at Kayzerslautern, in the Palatinate, in the year 1497, which measured nineteen feet in length, and weighed three hundred and fifty pounds. This is the celebrated fish put into the water by the Emperor Barbarossa in the year 1230, as appeared from an inscription engraved on a ring of gilt copper affixed to the fish, and which clearly proved it to be at the least two hundred and sixty-seven years old. A painting of this extraordinary fish was long preserved in the *Chateau de Lautern*, and the skeleton as well as ring at Mannheim. This is the most remarkable instance of longevity in the Pike at present known. Rzaczynski describes one that was ninety years old ; but after speaking of the Pike of Kayzerslautern this is scarcely worthy mention. It is sufficiently testified by all writers, that the Pike attains to a great size and very considerable age.

As the flesh of the Pike is not fat, and is easy of digestion, it affords an excellent food. In Germany and Lapland, where the Pike abounds, the inhabitants salt and dry this fish, and transport it in barrels to other parts, especially to the Catholic countries, where it forms a considerable article of commercial importance.

The Pike, which is of an olivaceous grey, changes to a fine green or greenish cast in the spawning season, which occurs in spring; the spots on the back and sides, which were before obscure, become then of a yellow or golden hue, the eyes vermillion red, or golden tinged

PLATE CIX.

with red; and the fins of an orange colour spotted with purple. According to Bloch the Pike is sometimes found of a fine orange-yellow spotted with black, and is then distinguished by the Dutch fishermen under the appellation of the King of Pikes.

In one specimen we counted sixteen rays in the dorsal fin, in the pectoral fin ten, ventral seven, anal thirteen, and caudal twenty-three.

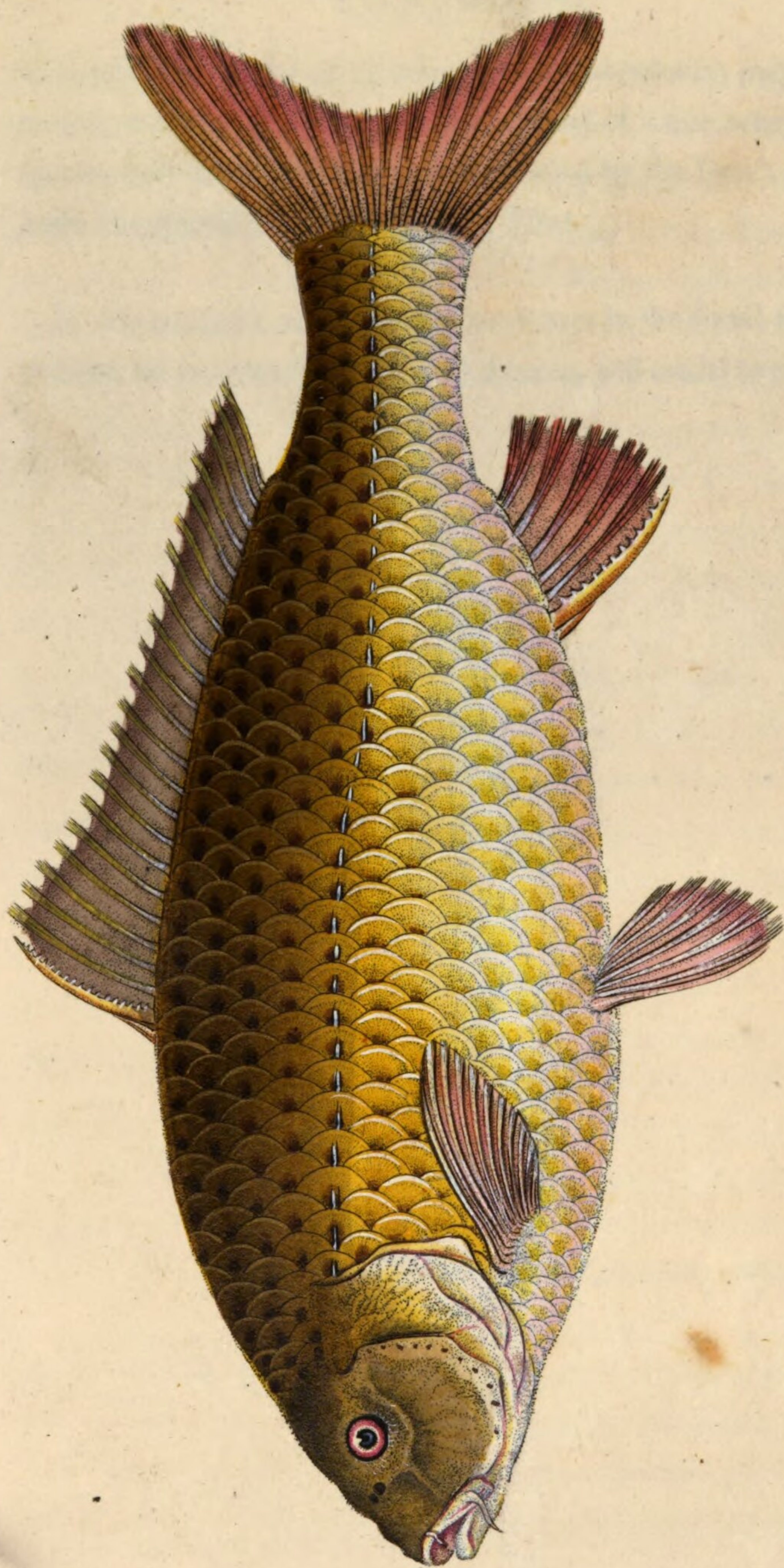


PLATE CX.

CYPRINUS CARPIO.

CARP.

*** PISCES ABDOMINALES.

GENERIC CHARACTER.

Mouth without teeth: gill membrane with three rays: body smooth, and whitish in general: ventral fins usually with nine rays.

SPECIFIC CHARACTER

AND

SYNONYMS.

Second anterior ray of the dorsal and anal fin osseous and serrated.

CYPRINUS CARPIO: ossiculo secundo in pinna dorsi anique serrato.

CYPRINUS CARPIO: pinna ani radiis 9, cirris 4 pinnæ dorsalis radio secundo postice serrato. *Linn. Faun. Suec.* 359. *Gmel. Linn. Syst. Nat. T. 1. p. 3. p. 1411. sp. 21.*

Cyprinus cirris 4, ossiculo tertio pinnarum dorsi anique uncinulis armato. *Art. Gen. 4. Syn. 3. spec. 25.*

The Carp, originally a native only of the warmer parts of Europe, has within the space of the last three or four centuries become by degrees habituated to colder climates, and, being a fish of excellent quality,

PLATE CX.

is now very generally naturalized in most of the northern parts of the continent, and in England. This fish is commonly supposed to have been first introduced by Leonard Mascall in the year 1514, or, as others believe, and with greater probability, at an earlier period; at least it is mentioned about twenty years before that time by *Wynkyn de Worde* in the "*Booke of St. Albons* *." He speaks of it as a "dayntous fische;" and adds "there ben but fewe in Englonde, and therefore I write the casse of him." Carps were introduced into Denmark in the year 1560 by Pierre Oxe, and are completely naturalized in that country; they were also introduced into Holland and Sweden, where they are now become naturalized. In Sweden, however, it appears to be uncommon still, as several vessels sail every year from Prussia to Sweden for the purpose of conveying Carps to that country. Russia, according to Mr. Pennant, wants the Carp to this day; they, however, receive those fish from Prussia in well-boats at some seasons of the year.

This fish varies in different countries very considerably: in the milder parts of Europe they grow to a large size, but towards the north they become gradually smaller. Carps vary also both in size and flavour, according to the nature of the waters in which they reside. Those of three or four pounds are common. In some parts of Prussia they are not unusual of about ten, twelve, or fourteen pounds weight. Mr. Pennant says, on his own knowledge, he can speak of none that exceeded twenty pounds in weight; but at the same time adduces the authority of *Jovius*, that they were sometimes taken in the Lago di Como of two hundred pounds weight, and of *Rzaczynski*, who mentions others taken in the Dneister that were

* Published in 1496.

PLATE CX.

five feet in length. Carps of this enormous size must be very scarce on the continent however, since Bloch records one of thirty-two pounds weight, taken in the domains of the *Comte de Schulenbourg*, in Saxony, as a very extraordinary example, and tells us of another taken at Dertz, upon the frontiers of Pomerania, of thirty-eight pounds weight, which from its uncommon magnitude was thought worthy of being presented to the King. It is chiefly in Austria, Prussia and Poland that the Carp is cultivated with success, and where it forms a considerable article of commerce, the traders purchasing the fish of the nobility, who derive a great revenue from the produce of their ponds.

The Carp is extremely tenacious of life, and highly prolific; they are reported to attain to the vast age of one hundred and fifty or two hundred years; that its term of life exceeds a century we have a number of well authenticated instances. Buffon says, he has seen Carps in the fosses of Pont Chartrain, which were known to be one hundred and fifty years old; and many of those introduced into the ponds at Versailles in the reign of Louis the Fourteenth were in being a short time before the revolution.

Its spawning season is in June, or, when the spring is forward, a month earlier; they breed in the usual manner, and deposit their eggs among the herbage: one female is commonly observed to be accompanied by three males. These fish live chiefly on aquatic insects, worms, and plants, and during the spawning time swim in troops.

The dorsal fin in the specimen selected for our figure contains twenty-three rays, pectoral fin ten, ventral seven, anal seven, and the tail nineteen.

PLATE CX

The last in length. Crops of this enormous size must be very scarce
 on the continent however, since Black records one of thirty-two
 pounds weight taken in the domain of the Count de Salsbourg
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 another taken at Dantz upon the borders of Pomerania, of thirty-
 eight pounds weight, which from its uncommon magnitude was
 thought worthy of being presented to the King. It is chiefly in
 Austria, Prussia and Poland that the Carp is cultivated with success,
 and where it forms a considerable article of commerce, the traders
 purchasing the fish of the nobility, who derive a great revenue from
 the produce of their ponds. The Carp is extremely voracious of life, and highly prolific; they
 are reported to attain to the vast age of one hundred and fifty or
 two hundred years; that its term of life exceeds a century we have
 a number of well authenticated instances. Buffon says, he has seen
 Carps in the forest of Pont Chateau, which were known to be one
 hundred and fifty years old; and many of those introduced into the
 ponds at Versailles in the reign of Louis the Fourteenth were in
 being a short time before the revolution.
 The spawning season is in June, or when the spring is far advanced.
 A month earlier they breed in the usual manner, and deposit their
 eggs among the straws; one female is commonly observed to be
 accompanied by three males. These fish live chiefly on aquatic
 insects, worms, and plants, and during the spawning time swim in
 troops. The dorsal fin is the specimen referred to our figure containing
 twenty-three rays, pectoral fin two, ventral seven, anal seven, and
 the tail nineteen.



PLATE CXI.

CHIMÆRA MONSTROSA.

SEA MONSTER.

***** PISCES CHONDROPTERYGII.

GENERIC CHARACTER.

Head pointed above: spiracle single, quadripartite, and under the neck: mouth placed beneath: upper lip five cleft: cutting teeth two in front both above and below: body elongated: dorsal spine single.

SPECIFIC CHARACTER

AND

SYNONYMS.

Snout with porous folds beneath: tail filiform.

CHIMÆRA MONSTROSA: rostro subtus plicis pertusis, cauda filiformi.

CHIMÆRA MONSTROSA: rostro subtus plicis pertusis. *Linn.*

Faun. Suec. 294.

Chimæra Monstrosa. *Bloch Ausl. Fisch. I. p. 161. n. 1. t.*

124.

Chimera. *Ascan. ic. rer, natur. t. 15.*

Squalus cauda longiore, quam ipsum corpus. *Art. Gen. 68.*

Genus Galci. *Jonst. pisc. t. 44. f. 2.*

Simia marina. *Gosn. aq. p. 877. ic. anim. p. 153.*

PLATE CXI.

Centrina prima, Centrina vera, Simia marina danica. Aldr. pisc.
p. 402. 403. 405.

Vulpecula. Ström. söndm. p. 289.

This is a fish of very singular appearance and beauty. The body is of a lengthened form, compressed and gradually tapering towards the tail, which terminates in a long slender filament. The head is large, thick, and ascending in front into a pyramidal form: each jaw is furnished with a pair of broad laminæ, which are crenulated at the tip: the upper lip is divided into five parts, and the front, from the mouth to the eyes, is marked by transverse undulations and pores; a line of this kind runs across the forehead beneath the point or tip, and is continued in a serpentine course into the lateral line; and another line passes from this beyond the eyes, which returns again towards the nostrils.

The whole body is dark-brown above, varied with yellowish brown and silvery, and the lower parts of a bright silver colour. The eyes large and of a green colour, with silvery irides, and very brilliant, or shining with phosphoric splendour. The male is distinguished by having a small fringed crest on the top of the head, and by the rough lengthened processes at the anal fin, which correspond with those observed in the males of the Ray and Shark tribe.

The *Chimæra Monstrosa* inhabits the northern seas of Europe, and is rarely seen so far to the southward as the British Isles: it grows to the length of three or four feet, and subsists on marine worms and fish of the smaller kinds. The Norwegian fishermen

PLATE CXI.

call it the king of herrings, from the circumstance of its being often lurking among the shoals of that fish, the flesh of which appears to be its principal food. The flesh is hard, coarse, and uneatable; the inhabitants of Norway employ, however, the roes of this fish in their pastry, and in making cakes; and extract an oil from the liver, which they consider of singular efficacy in disorders of the eyes.

There are two species of the *Chimæra* genus, *Monstrosa*, and *Callorhynchus*; the latter of which is distinguished by the name of Southern Chimera and Elephant Fish.

PLATE CXL

call it the king of herrings, from the circumstance of its being often taken among the shoals of that fish, the flesh of which appears to be its principal food. The fish is hard, coarse, and unpalatable; the inhabitants of Norway display, however, the root of this fish in their pastry, and in making cakes; and extract an oil from the liver, which they consider of singular efficacy in disorders of the

There are two species of the Chimera genus, *Monstrosa*, and *Galeorhinus*; the latter of which is distinguished by the name of Southern Chimera and Elephant Fish. The former is a large, robust fish, with a broad, flat head, and a long, pointed snout. It has a large, open mouth, and a small, pointed tail. The skin is covered with small, bony scales. The color is a mottled brown and white. It is found in the North Atlantic, and is taken in great numbers by the fishermen. The flesh is said to be good for food, and the oil is used in medicine.

The Southern Chimera is a smaller fish, with a more slender body. It has a long, pointed snout, and a small, pointed tail. The skin is covered with small, bony scales. The color is a mottled brown and white. It is found in the North Atlantic, and is taken in great numbers by the fishermen. The flesh is said to be good for food, and the oil is used in medicine.

The Chimera *Monstrosa* inhabits the northern seas of Europe, and is rarely seen so far to the southward as the British Isles. It grows to the length of three or four feet, and attains to a great age. The Southern Chimera is much smaller, and is found in the same seas.





PLATE CXII.

SALMO SALVELINUS.

SALVELIAN CHARR.

**** PISCES ABDOMINALES.

GENERIC CHARACTER.

Head smooth, and compressed. Mouth large: lips small: tongue white, cartilaginous, and moveable: teeth in the jaws, and upon the tongue. Eyes moderate, and lateral. Branchiostegous membrane with from four to twelve rays; cover of three plates. Body long, covered with rounded and very finely striated scales: back convex: lateral line straight, and nearest to the back: posterior dorsal fin fleshy without rays: ventral fin of many rays.

SPECIFIC CHARACTER

AND

SYNONYMS.

First ray of the dorsal and anal fin white.

SALMO SALVELINUS: radio primo in pinna ventrali analique albo.

Bloch. Fisch. Deutschl. 3. p. 149. n. 9. t. 99.

SCHWARZREUTERL. *Schrank. Schr. der berl. Naturf. Fr.* 1.

p. 380.

PLATE CXII.

This is the Torgoch or "*red belly*" of the Welsh, a fish at present confined to the waters of the Llyn Quellyn, one of the alpine lakes, situated in the deep valley on the west side of Snowden. The Torgoch inhabited the Llanberris lake on the opposite side of the mountain till within the last twenty years, since which time they have entirely disappeared:—it is believed that the noxious waters of a neighbouring copper-mine flowing into the lake has destroyed the brood, as those fish inhabit only the purest waters.

Llyn Quellyn is a vast lake, of unknown depth, sheltered on one side by an abrupt mountain, which rises immediately out of the water, and in the deep recesses at the base of which the Torgoch is supposed to pass the milder seasons of the year in perfect security. Those fish approach the shallower parts of the lake in winter, about the middle of December, appearing in small troops at a short distance from the shores, and are at this season taken in some plenty by a poor cottager, who resides in the vicinity of the lake, and derives a small annual profit from the fishery; this delicious fish being in much request for the tables of the neighbouring gentry.

This fish differs from the Charr of Wynandermere, in Westmoreland, and can be no other in our idea than the true *Salmo Salvelinus*. The Torgoch spawns later in the season, and never increases to a size much larger than that represented in our plate, which is scarcely half the dimensions of the other. The outline is more slender, and the colours in point of splendour far superior. The lower jaw in the Torgoch, contrary to the Gmelinian character of *Salvelinus*, projects rather beyond the upper one, and in this respect accords with *Alpinus*: it must, however, be recollected, that the elongation of the lower jaw in the *Salmo* tribe is

PLATE CXII.

not always to be regarded as a specific distinction, these fishes varying at different seasons of the year in this particular considerably. We need only adduce in proof of this the remarkable elongated appearance which the lower jaw of the common Salmon has when it goes out of season; and also of the trout when it attains a large size, in which the same circumstance is observable. From the general habit of the Torgoch we conclude upon the whole it must be the *Salmo Salvelinus*.

This fish is of an elegant and somewhat slender shape, the head long and rather pointed, and its colours splendid beyond all example among the indigenous fishes of this country. Nothing can exceed the fervid aspect of its colours when first taken; the scarlet of the belly may be truly said to emulate the glowing redness of the fiery element. The upper part of the head and back is of a deep purplish blue, blending into silvery in approaching the lateral line, beneath which the sides are tinged with yellow, passing into orange, and the orange into fine scarlet as it descends towards the belly; the whole of the back and sides are spotted in a most beautiful manner with fine red; the lower fins are also red, except the first ray of the ventral and anal fin, which are white. Upon opening the males we found the roe white; the eggs of the female were of the finest orange colour, and as large as peas, from which, when we consider the small size of the fish, it will be concluded that they are by no means a prolific species. The flesh is excellent, and of a deep red colour. In the first dorsal fin of the specimen represented we counted eleven rays: in the pectoral fin thirteen: in the ventral nine: anal eleven: and caudal twenty-four.

PRIVATE CANAL

not always to be regarded as a specific diagnosis, these fishes
varying in different seasons of the year in the same considerably.
We need only address in proof of this the remarkable elongated
appearance which the lower jaw of the common Salmon has when
it goes out of season, and also of the trout when it attains a larger
size, in which the same circumstance is observed. From this
general habit of the Torpedo we conclude upon the whole it must
be the Salmo salar, and not the Salmo trutta, as it is not so large.

This fish is of an elegant and somewhat slender shape, the head
long and rather pointed, and its colour is a silvery blue, all examples
among the indigenous fishes of this country. Nothing can exceed
the varied aspect of its colour when first taken, the result of the
belly may be truly said to resemble the glowing robes of the day
element. The upper part of the head and back is of a deep purplish
blue, blending into silver in approaching the lateral line, beneath
which the sides are tinged with yellow, passing into orange, and
the orange into the lighter and bluish green towards the belly; the
whole of the back, and sides, is covered with a most beautiful manner
with fine red; the lower part is also red, except the fin ray of
the ventral and anal fin, which are white. Upon opening the maw
we found the eye white, the eye of the female was of the finest
orange colour, and as large as the eye of the male, when we compared
the small size of the fish, it will be concluded that the eye is no
more a specific character. The fish is elongated and of a deep red
colour. In the first dorsal fin of the male, we observed
coloured, eleven rays; in the second, six, thirteen in the ventral
dorsal anal eleven; and caudal twenty-four, combined in one
fin, and covered, and it is very large. The female is much
smaller, and is well known to be the Salmo trutta.



PLATE CXIII.

CYPRINUS TINCA.

TENCH.

**** PISCES ABDOMINALES.

GENERIC CHARACTER.

Mouth without teeth: gill membrane with three rays: body smooth, and whitish in general: ventral fins usually with nine rays.

SPECIFIC CHARACTER

AND

SYNONYMS.

Scales small: fins thick.

CYPRINUS TINCA: squamis parvis, pinnis crassis. *Bloch. Fisch.*

Deutschl. 1. p. 83. n. 14.

CYPRINUS TINCA: pinna ani radiis 25, cauda integra, corpore

mucoso, cirris 2. *Linn. Fn. Suec. 263.—Müll.*

Zool. Dan. p. 50. n. 428.—Gmel. Linn. Syst.

Nat. T. 1. p. 3. p. 1413. sp. 25.

Brama pinnis circinatis et cauda atris, &c. *Klein. miss. pisc. 5.*

p. 63.

TINCA. *Rondel. pisc. 2. p. 157.—Gesn. aq. p. 984.—Johnst. pisc.*

p. 646.—Will. Ichth. p. 251. t. 5.—Marg.

Danub. p. 47. t. 15.

Tench. *Brit. Zool. 3. p. 306. n. 3.*

PLATE CXIII.

The Tench is esteemed a silly fish, and one that may be taken without difficulty. It is found in most lakes and rivers, but seems to prefer tranquil waters in retired situations.

As an article of food, the Tench is not uniformly approved; for although in England it has many admirers, it is considered as an insipid and worthless fish, if not unwholesome, in some other countries. M. de Bergen believes the Tench sleeps during the winter, and is revived again in spring by the genial warmth of the sun. In the month of June they seek the herbage in the shallow parts of the water to deposit their eggs.

The general colour is olive or olivaceous brown, variable in different fishes according to the season of the year. When in high perfection the back is olive, the head and sides green glossed with yellow, and the whole partaking of a fine gilded hue, as the center of every scale is of a golden colour. The fins greenish, dusky, and reddish at the base; the eyes fine red. The Tench is particularly distinguished from the minuteness of its scales. The dorsal fin contains ten rays: pectoral fin twelve rays: ventral fin nine rays: anal fin eight rays: and the tail twenty-four.

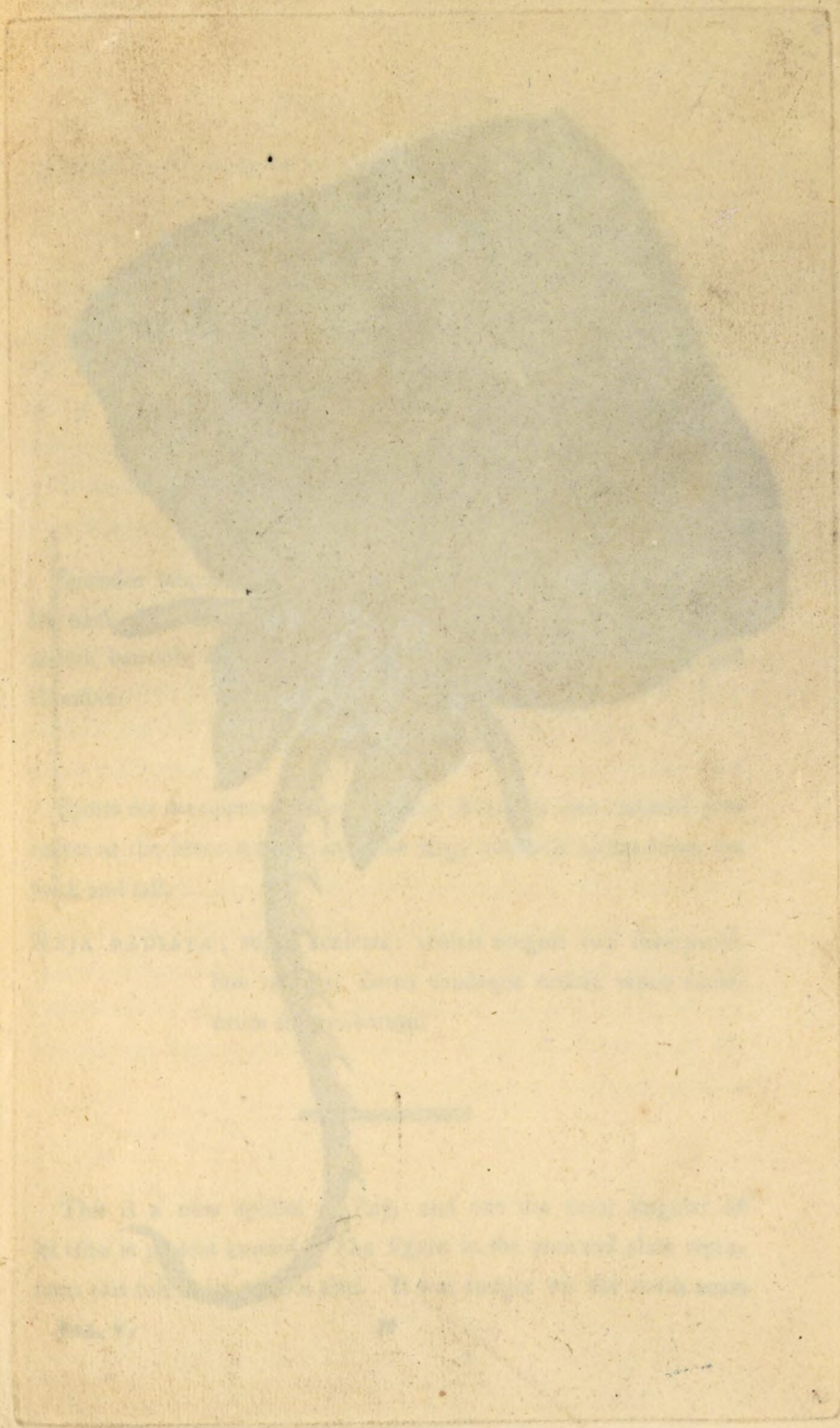




PLATE CXIV.

RAJA RADIATA.

STARRY RAY.

***** PISCES CHONDROPTERIGII.

GENERIC CHARACTER.

Spiracles ten, five on each side, oblique, and placed beneath, near the neck: head small, pointed, not distinct from the breast, with the mouth beneath, transverse, and toothed: body thin, depressed, and rhombic.

SPECIFIC CHARACTER.

Spines on the upper surface large and divergent into radiated processes at the base: a single series of large subconic spines down the back and tail.

RAJA RADIATA: supra aculeata: aculeis magnis basi divergentibus radiatis, dorso caudaque ordine unico aculeorum subconicorum.

This is a new species of Ray, and one the most singular of its tribe at present known. The figure in the annexed plate represents this fish in its natural size. It was caught on the north coast

PLATE CXIV.

of Britain, and obligingly communicated to us by Mr. Statchbury, of the Old Jewry, London.

As the individual specimen above mentioned is the only one of its kind that has occurred to our observation, we are unable to determine if this curious species ever attains to a larger size; though we should rather suspect it may. Whether, however, it be in the young or adult state, it is obviously of a species not hitherto described by any author, and is therefore to be regarded as an interesting addition to the *Raja* genus: and to the British *Fauna* in particular.

Should this fish grow to a large size it must become a powerful and formidable animal. The whole of the upper surface is aculeated, or beset with spines of a small size, interspersed with others which are much larger in proportion to the magnitude of the fish than is observeable in any other of the Ray tribe. The greater spines are of two kinds; those with a large subconic furrowed base, and such as are distinguished by their remarkable radiated processes, divergent at the base as from a common center, and assuming altogether a singular stellated appearance. Those with a conic base are disposed chiefly in a single series along the back and tail; and the others, which are radiated at the base, are scattered over the surface of the wings; the latter-mentioned spines are extremely curious, and appear to be entirely peculiar to this particular species.

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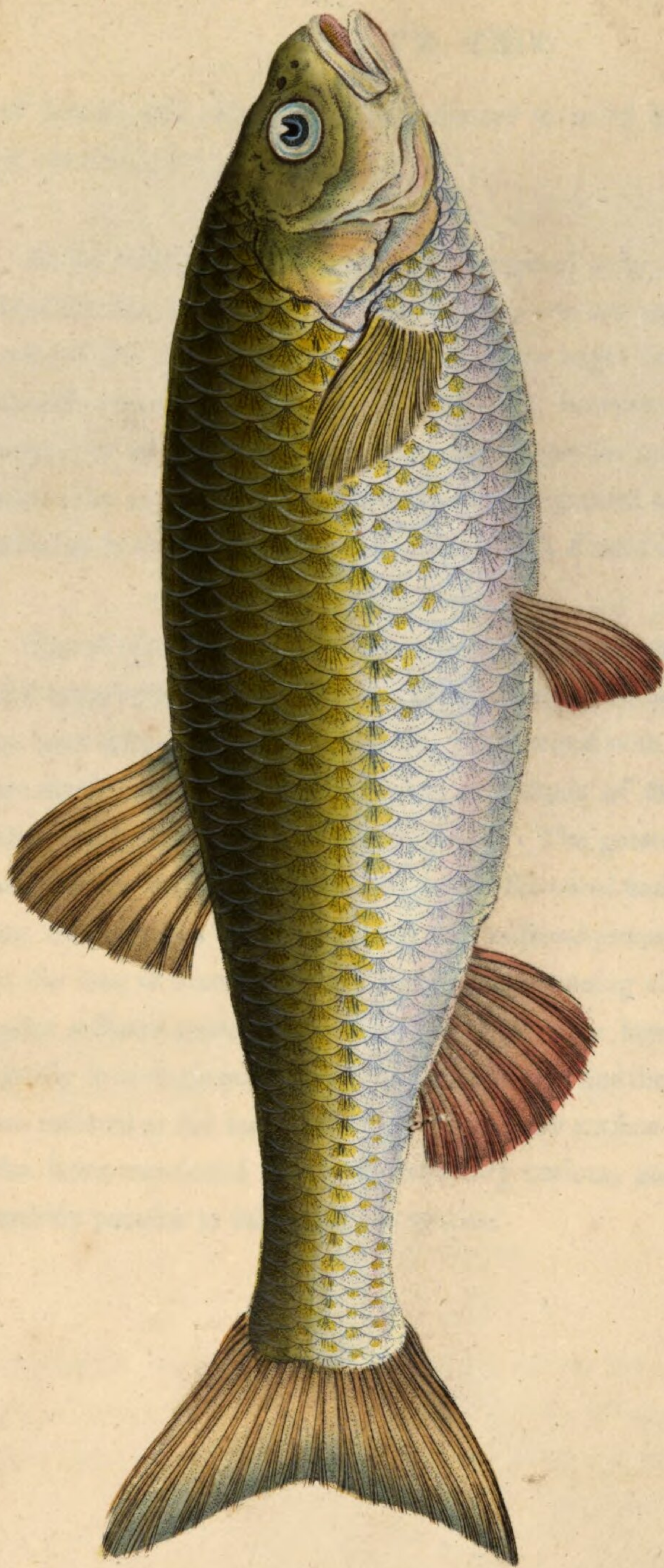


PLATE CXV.

CYPRINUS JESES.

CHUB.

*** PISCES ABDOMINALES.

GENERIC CHARACTER.

Mouth without teeth: gill-membrane with three rays: body smooth,
and whitish in general: ventral fins usually with nine rays.

SPECIFIC CHARACTER

AND

SYNONYMS.

Body and head thick: snout roundish: about ten rays in the anal
fin.

CYPRINUS JESES: corpore et capite crasso, rostro rotundato, pinna
ani radiis 14. *Bloch. Fisch. Deutschl.* 1. p. 45.
n. 6. t. 6.

CYPRINUS JESES: pinna ani radiis 14, rostro rotundato. *Gmel.*
Linn. Syst. Nat. T. I. p. 3. p. 1314. sp. 20.

Cephalus fluviatilis. Rondel. pisc. 2. p. 190.

CHUB. *Penn. Brit. Zool. V. 3. p. 368. sp. 175.*

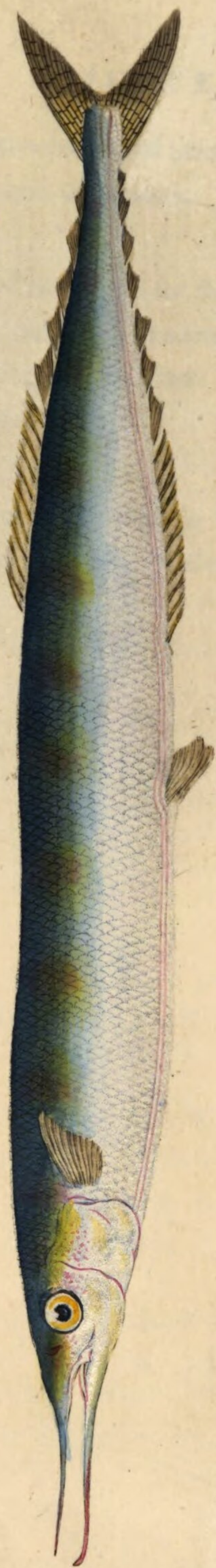
The Chub is an inhabitant of Europe, and is a species of the
fresh-water kind, in some measure peculiar to large rivers, where it

PLATE CXV.

lies in holes and the most retired places: it is of a shy and timid nature, and subsists on worms and insects. The spawning season is in May.

This is a fish of no esteem for the table, being coarse and full of bones; it grows only to a moderate size, a Chub of four or five pounds weight being very unusual. The colours vary a little according to the season of the year.

In the specimen represented in the annexed plate the dorsal fin contains nine rays: pectoral twelve: ventral eight: anal ten: and caudal eighteen.



London. Publ^d as the Act directs by E. Donnan & F. C. & J. Richardson. Aug. 1st. 1807.

PLATE CXVI.

ESOX SAURUS.

SKIPPER PIKE.

**** PISCES ABDOMINALES.

GENERIC CHARACTER.

Head flattish above: mouth and throat large: jaws toothed: unequal, the upper one flat, lower punctated: tongue broad, loose: palate smooth: eyes round, moderate size, and lateral: nostrils double near the eyes. Gill-covers large, aperture ample, with from seven to twelve rays. Body elongated, covered with hard scales, above convex, and compressed on the sides: lateral line straight, nearest the back, and scarcely visible: dorsal and anal fin very short, and placed opposite.

SPECIFIC CHARACTER

AND

SYNONYMS.

Jaws subulate, and slightly curving upwards, lower one longest: above and beneath spurious fins near the tail.

ESOX SAURUS: maxillis subulatis subascendentibus, inferiore longiore, caudam versus supra infraque pinnulis spuriiis.

SAURUS. *Rondel. de Piscibus, lib. 8. p. 232. Gesn. l. 4. p. 468.*

PLATE CXVI,

SKIPPER. *Raii. Syn. Pisc.* p. 169.

The Saury. *Penn. Tour Scot.* 1769.—*Brit. Zool.* 3. p. 325.
Linn. Trans. V. 3. p. 60.—*Turt. Gmel. Linn.*
V. 1. p. 862.—*Shaw. Gen. Zool.* V. p. 1. 114.

Our countryman Ray appears to be the first writer who describes this rare and curious species of *Esox* as a native of Britain; he speaks of it as a Cornish fish under its provincial name of Skipper. Rondeletius and Gesner previously mention it as a scarce kind among the fishes of the Mediterranean. In 1769 the same fish was again introduced to notice by Mr. Pennant in his *Tour of Scotland*, and afterwards in his *British Zoology*, wherein we are informed, that vast numbers of them were thrown ashore on the sands of Leith, near Edinburgh, after a great storm, in November 1768. In the summer of the year 1800 a single specimen was taken near the Isle of Portland, in Dorsetshire, after a hard storm, an account of which, accompanied with a figure of the fish in its natural size, is given by the Rev. Mr. Rackett, F. L. S. in the third volume of the *Linnæan Transactions* *; and since that period the specimen in our possession occurred likewise on the British coasts. It is altogether singular that this fish has no place in either of the editions of the *Linnæan*

* This fish appears to be rare on the Dorset coast. Mr. Rackett tells us, that of the fishermen in this part, one only was acquainted with it, and called it a Skipper, the name under which, according to Ray, it was known in his time on the coast of Cornwall. This writer adds, that the species has not been noticed by Linnæus, Gmelin, nor Bloch; and that Pennant has given a very indifferent figure of it in his *Tour in Scotland*, and has made use of the same plate in his *British Zoology*. Vide *Linn. Trans.* V. 3. p. 60.

PLATE CXVI.

Systema; it is inserted by Dr. Turton in his translation of Gmelin on the authority of Pennant.

The length of our fish is about eighteen inches; the body of a long and slender form; not like that of an eel as writers describe, but agreeing precisely with that of the common Gar-fish, (*Esox belone*.) The snout is subulate, fine, toothless, and slightly curving upwards*. The jaws are of unequal length, the lower being longest, and bending upwards at the tip, in which respect it differs from the figures of Mr. Pennant and Mr. Rackett, in both of which the jaws appear straight and of equal length. Neither do the jaws when closed exhibit that remarkable hiatus or gaping shewn in those two representations; there is a kind of flexuosity in the shape of the mouth when open which might excite such an idea, but upon gently closing it the curvature in the form of one jaw will be found to correspond with the suture of the other, so that the specific character,

* Dr. Shaw observes, that "in a specimen figured in the work of Cope the jaws are represented curving upwards, contrary to what has hitherto been observed; the specimen figured in the work of Mr. Pennant, as well as that of Rondeletius, and the drawing by Mr. Rackett, have the jaws strait." This is certainly true, and it is therefore to be presumed that the fishes from whence the accounts of the latter-mentioned writers have been taken must have sustained some injury, or been misrepresented; for it is clear Cope is right in representing the jaws curving upwards: it is indeed evident, from the comparative shortness of the jaws both in the figure of Mr. Pennant and Mr. Rackett, that neither could have been perfect, the beaks in the fish itself being nearly twice the length delineated by either.

We could have likewise wished that the intersecting lines in the figure drawn by Mr. Rackett, in the Linnæan Transactions, had been rendered less liable to misconception; for Dr. Shaw, who apparently never had an opportunity of examining the fish, is entirely misled by it. "In an elegant drawing of this fish, (says Dr. Shaw) communicated

PLATE CXVI.

“maxillis medio hiantibus,” assigned to it by Mr. Rackett in the paper above mentioned is by no means applicable.

Some misunderstanding seems to prevail likewise with regard to the colour of the fish: Mr. Pennant describes it as having the back dusky, and the belly bright and silvery; in which particulars he is followed by Dr. Shaw, who remarks that the colour of the whole animal is dusky above and silvery beneath, or that with equal propriety it might be said to be silvery, with dusky or bluish brown back. This is not, however, the fact; the true colour of the fish on the back is a most lovely azure blue, changeable to green, and glossed with purple and yellow instead of dusky, and the lower parts silvery. The fish in this respect does not appear to be described correctly by any writer except Mr. Rackett, who defines it with accuracy in his general description, “*Dorsum viridi-cæru-*

by the Rev. Mr. Rackett, I observe, that the skin appears reticulated by fine lines, decussating each other at equal distances.”—This is most assuredly not the natural appearance of the fish; the decussating lines are no doubt intended merely to represent the scales of the fish. The figure given in the British Zoology is still more erroneous, as it appears entirely smooth and destitute of any scale-like appearance. But a greater defect than this in the drawing above adverted to, remains to be mentioned: this relates to the spurious fins at the posterior part of the body both above and beneath, which, instead of being distinct, are seen running one into the other, as if connected by a common membrane throughout, while in the fish itself those fins are perfectly detached from each other. The figure in the British Zoology is less exceptionable in this respect, but even these are inexpressive, every pinnule appearing to be attached by its posterior ray close to the body of the fish. There appears to be also some mistake with regard to the number of those fins; in the figures above noticed, these amount to six above, and six beneath, but in the specimen now before us the number on the upper part is five, and beneath seven.—It was conceived necessary to be thus minute, in order to place the description of this ambiguous, and little known species in its true point of view.

PLATE CXVI.

lescens. Venter argenteus." The body has a smooth appearance, the scales with which it is covered being thin and glabrous: the lower part of the body from the gills to the tail is marked with a longitudinal carena or keel, which terminates at the latter part in a somewhat protuberant manner. The species may be readily distinguished by the pinnules or spurious fins on the body near the tail, in which particular it agrees with the Scomber or Mackrel genus; and to this in point of flavour the flesh of the fish is also said to bear a strong resemblance. The tail is remarkably furcated, of a pale brownish colour half way down from the base, and the rest dusky.

All the fins in this species are small: the dorsal fin is placed far down the back, and contains eleven rays, between which and the tail the five distinct pinnules of the upper part of the fish are situated: the pectoral fin is somewhat falcated, and contains eleven rays: and the ventral fin six rays: the anal fin is placed opposite to the dorsal one, and contains eleven rays; and between this and the tail are seven distinct pinnules: the tail itself contains twenty-two rays.

PLATE CXVI

"Enter argenteus." The body has a smooth appearance, the scales with which it is covered being thin and glabrous; the lower part of the body from the gills to the tail is marked with a longitudinal carina or keel, which terminates at the latter part in a somewhat protuberant spinner. The species may be readily distinguished by the pinnules of spines on the body near the tail, in which particular it agrees with the Scomber or Mackerel genus, and to this in point of flavour the flesh of the fish is also said to bear a strong resemblance. The tail is remarkably falcate, of a pale brownish colour half way down from the base, and the rest dusky.

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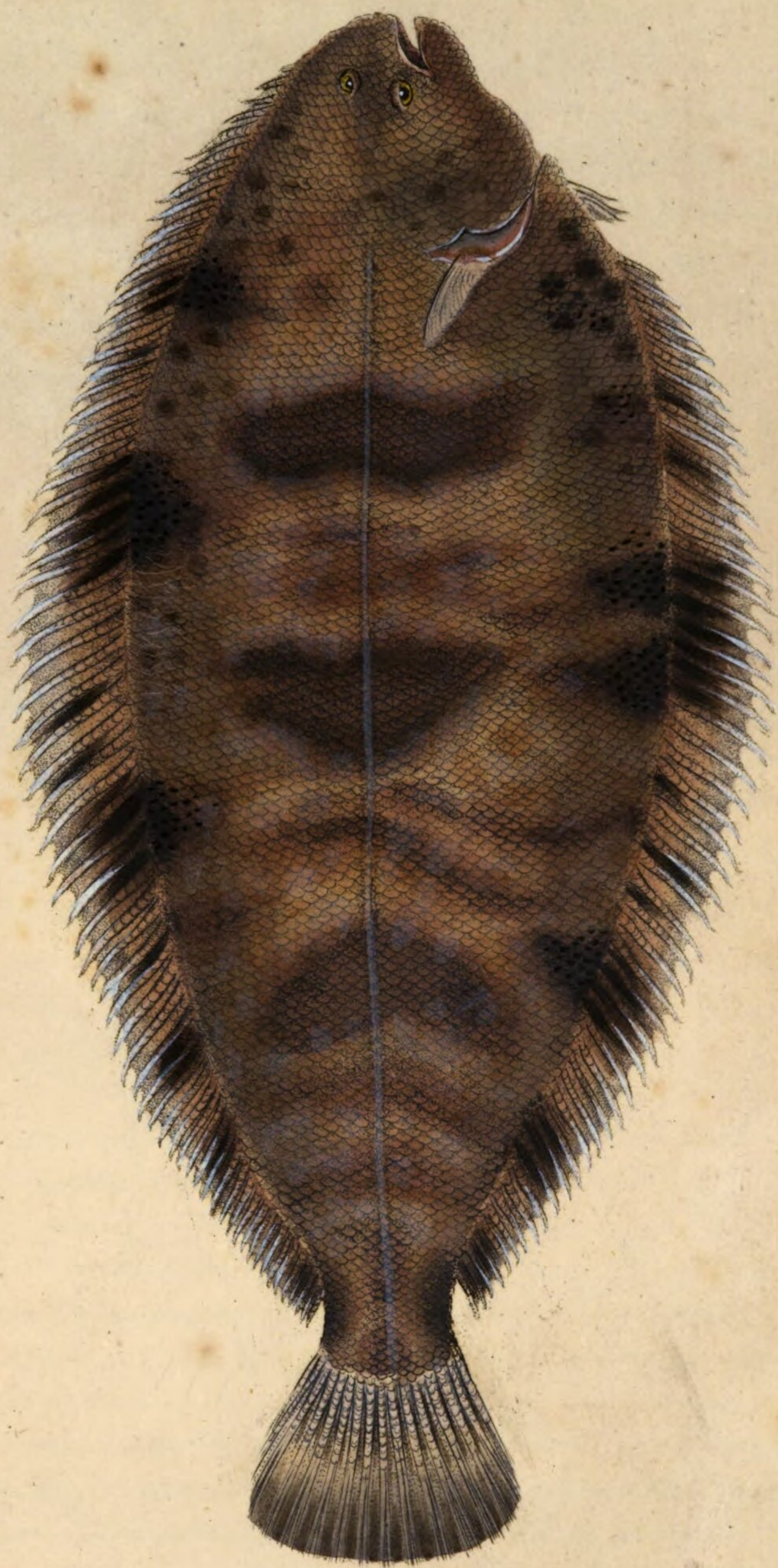


PLATE CXVII.

PLEURONECTES VARIEGATUS.

VARIEGATED SOLE.

***PISCES THORACICI.

GENERIC CHARACTER.

Head small. Eyes spherical, both on the same side of the head, and near each other. Mouth arcuated. Jaws dentated, unequal. Gill-membrane with from four to seven rays. Gill-covers of three plates in general. Body compressed, carinated; upper side sub-convex: beneath flat and pale. Vent nearer the head.

SPECIFIC CHARACTER.

Body oblong; pale, clouded or marbled with fuscous: scales large.

PLEURONECTES VARIEGATUS: corpore oblongo, pallido fusco-nubuloso: squamis magnis.

This interesting acquisition was caught on our coast in the month of April 1807, and brought by the fishermen with other flat fish for sale to the Billingsgate market. The fish is very curious, and constitutes an intermediate species between several of the described kinds of the Pleuronectes genus, being allied in some particular

PLATE CXVII.

respects to three or four different species, though not according altogether with either.

The species bears the nearest resemblance to the common Sole; it differs in its general outline, being rather shorter and of a somewhat more rounded figure. In the form of the mouth and perfect straightness of the lateral line it agrees with the Sole, but it again differs in the extremity of the dorsal and anal fin not reaching so near the tail as in the common Sole, and in having the scales considerably larger than in that fish. It is the comparative magnitude of its scales in particular that at once removes it from the common Sole, which Klein so well defines by the appellation of *Solea squamis minutis*; and yet they are not of sufficient size to authorise us in referring the species to the large-scaled Sole of Rondeletius. The scales in the common Sole are remarkably diminutive, in the large-scaled Sole of considerable size, and our present species forms a medium between the two. In order that no doubt may remain on this subject it should be observed, that independently of the scales in our present fish being rather less than half the size of those in the large-scaled Sole, the latter species is of a more lengthened form, with the head long, pointed, and destitute of scales; and the mouth very wide and armed with large teeth: on the contrary, the form of the head in our fish agrees with the common Sole, is covered with scales, and has the mouth of a small size.—The marbled appearance of its upper surface seems to correspond in some degree with the *Achire marbré* of Cope, the scales of which are, however, scarcely perceptible, which immediately determines that it cannot be of this species.—In the disposition of the principal fuscous marks across the body of our fish, forming as it were a series of interrupted bands, there appears to be some affinity between this fish and the

PLATE CXVII.

Zebra Sole, and of which indeed it might be mistaken for a variety at the first view. The resemblance, however, merely consists in this fasciated appearance; on examination it will be found that in the Zebra Sole the dorsal and anal fins are united by a common membrane at the posterior extremity to the tail, while in our fish it is perfectly detached.—The *Linguatula* of Bellonious and Willoughby bears some resemblance likewise to our fish, so far as the accounts afforded of that ambiguous species assist opinion; but the mouth of *Linguatula* is said to be very wide, which is not the case with the fish before us.—These are the only species of *Pleuronectes* described by authors that seem to accord with our present species, and which we therefore presume must be considered as a non-descript.

The specimen is represented nearly in its natural size, the length being nine inches. Its upper surface, as appears in the figure, is pale, clouded with fuscous, the lower white. The dorsal fin contains sixty-eight rays: anal fifty-three: and the tail sixteen.

PLATE CKVII.

Xebra Sole, and of which indeed it might be mistaken for a variety at the first view. The resemblance, however, merely consists in this fasciated appearance; on examination it will be found that in the Xebra Sole the dorsal and anal fins are united by a common membrane at the posterior extremity to the tail, while in our fish it is perfectly detached. The Linguistola of Bellonius and Willoughby bears some resemblance likewise to our fish, so far as the accounts afforded of their ambiguous species assist opinion; but the mouth of Linguistola is said to be very wide, which is not the case with the fish before us. These are the only species of Pleuronectes described by authors that seem to accord with our present species, and which we therefore presume must be considered as a new description.

The specimen is represented nearly in its natural size, the length being nine inches. Its upper surface, as appears in the figure, is pale, clouded with fuscous, the lower white. The dorsal fin contains sixty-eight rays, anal fifty-three, and the tail sixteen. The head is large, the eyes are small, and the mouth is wide. The gills are small, and the operculum is large. The scales are small, and the skin is smooth. The fish is a common species, and is found in the North Sea.

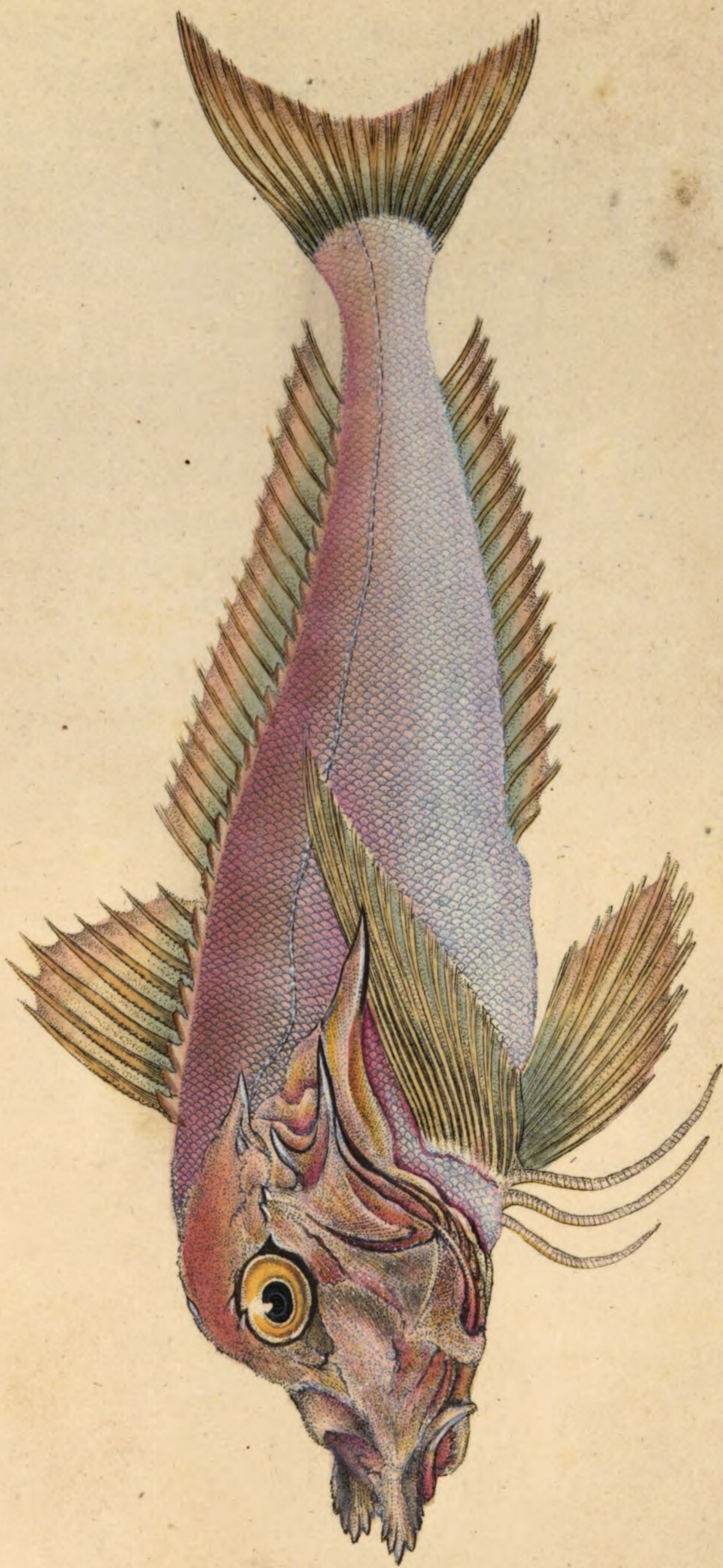


PLATE CXVIII.

TRIGLA LYRA.

PIPER.

*** PISCES THORACICI.

GENERIC CHARACTER.

Head large, mailed and marked, with rough lines. Eyes large, round, placed vertically. Mouth large. Palate and jaws armed with sharp teeth. Nostrils double. Gill-cover, a single piece, radiated and spined. Seven rays in the gill-membrane. Body wedge-shaped, and covered with small scales. Back straight, with a longitudinal groove serrated on the margins. Lateral line nearer the back, and straight. Abdomen thick. Ventral and pectoral fin large, with articulated appendages before them.

SPECIFIC CHARACTER

AND

SYNONYMS.

Appendages three: nostrils tubular.

TRIGLA LYRA: digitis ternis, naribus tubulosis. *Gmel. Linn.*

Syst. Nat. T. I. p. 3. 1342. sp. 2.

Trigla rostro longo diacantho, naribus tubulosis. *Art. Gen. 46.*

syn. 74.

PLATE CXVIII,

PIPER, *Will. Ichth. p. 282.*

Ray, Pisc. p. 89.

Penn. Brit. Zool. 3. p. 234. n. 3. t. 14.

The Piper appears to be a local fish on the British coasts, and is far more rarely brought to the London markets than any other of the Gurnard tribe known to be natives of our seas, the *Trigla lineatus* excepted. Mr. Pennant received this species from Mr. Pitfield, of Exeter, and says he has been informed this fish is found at all times of the year on the western coast, and is taken in nets. If this information be correct, it is possible this fish may have become more scarce of late; for we must observe, that our enquiries after the species on the western coasts have not hitherto proved successful, although Gurnards in general are abundant in that part of Britain. Neither have we met with this fish in Anglesea, upon the coast of which, the same writer informs us, it is also found. It does not appear, upon the credit of the best writers, to be common in other parts of Europe: Gmelin speaks of it only as a native of the British seas.

Our specimen of this fish is about eighteen inches in length; it is said to grow to the length of two feet, and three pounds and a half in weight. The general colour is a pale flesh-colour, rosy or darker on the back, and the belly white; the fins bluish at the base, and tinged with reddish towards the extremities; the eyes full, with the irides of a fine golden yellow, and the pupil purplish black.

PLATE CXVIII.

The rays of the first dorsal fin are bony, serrated anteriorly, and eight in number ; the second dorsal fin contains twenty soft rays ; the pectoral fin twelve, ventral nine, anal eighteen, and caudal eighteen. The dentated tubular processes into which the front of the head is elongated, forms a striking character of this fish ; it may be also added, that neither of the other British species of Gurnards have the gill-covers armed with spines of such considerable strength and size as the Piper.

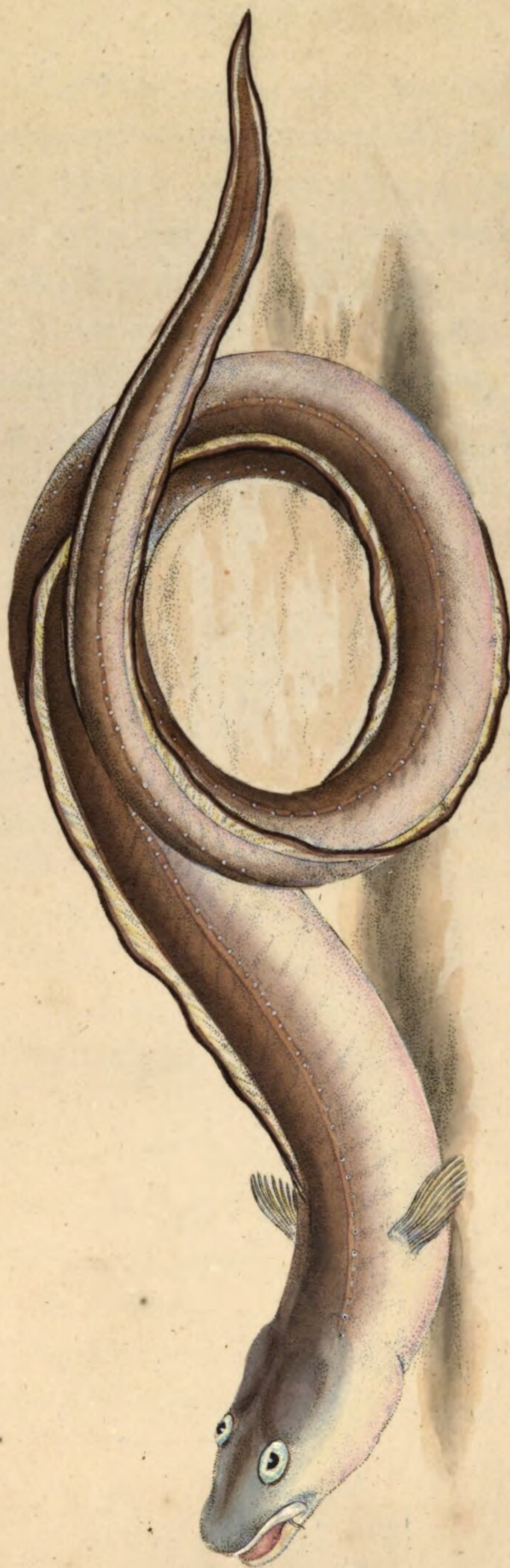


PLATE CXIX.

MURÆNA CONGER.

CONGER EEL.

* PISCES APODES.

GENERIC CHARACTER.

Head smooth: nostrils tubular: gill-membrane with ten rays: eyes covered with a common skin: body round and mucous: caudal, dorsal, and anal fin united.

SPECIFIC CHARACTER

AND

SYNONYMS.

Snout with two tentacula; lateral line whitish with a row of dots.

MURÆNA CONGER: rostro tentaculis duobus, linea laterali ex puncto albida. *Gmel. Linn. Syst. Nat. T. 3. p. 1. p. 1135. sp. 9.*

Muræna supremo margine pinnæ dorsalis nigro. *Art. Gen. Syn. 24. syn. 40.*

Muræna pinna ani caudæ dorsique coadunata, linea laterali alba. *Bloch. Ausl. Fisch. 2. p. 37. t. 155.*

Conger Eel. *Will. Ichth. 111.—Raii. Syn. pisc. 37.*

Penn. Brit. Zool. Vol. 3. p. 147.

PLATE CXIX.

The Conger Eel is taken on most of the British coasts ; but the principal fishery is in the county of Cornwall. This voracious fish preys on molluscæ, crustaceous animals, and small fishes, and sometimes arrives at a very considerable size. In the Mediterranean and North Seas, where the Conger is common, examples of this fish from thirty to sixty pounds weight are not unusual. Dr. Borlase assures us Congers are sometimes taken near Mount's Bay, Cornwall, of one hundred pounds weight ; and a specimen lately caught at the Nore, near the entrance of the river Medway, is preserved in our Museum, the weight of which was one hundred and thirty pounds when first taken. Mr. Pennant heard of some caught near Scarborough, that were ten feet and a half in length and eighteen inches in circumference in the thickest part. Those we believe are the largest known.

These fish are chiefly taken by means of *butlers*, or strong lines, three, four, or five hundred feet in length, and furnished with a vast number of hooks, fastened at the distance of about six feet from each other, and baited with pilchard, or mackarel. The flesh of the Conger is well flavoured, and we think delicious when roasted, the oil with which it abounds being more copiously extracted by this means than in boiling, or any other mode of cookery. These fish form an article of commerce on the Cornish coasts, and in times of peace are exported from thence to Spain and Portugal. Dr. Borlase relates the manner in which the Congers are cured in Cornwall: they are slit, he tells us, and hung on a frame till they are dry, in the process of which a considerable quantity of oil exudes. It is remarkable, that a Conger of a hundred weight will waste by drying to about one-fourth, or twenty-four pounds. The flesh of the Conger dried, is ground into powder, and employed in making soups.

PLATE CXIX.

The general colour of this fish varies from greyish to dark olive on the back, the belly white, the fins whitish with the extreme edge black. We apprehend the cinereous variety of *Muraena Mytus*, described by Forskal as being entirely of a cinereous colour, with the fins white, and edged with black, may prove, on further investigation, to be the young, or a variety of the Conger.

PLATE CXIX.

The general colour of this fish varies from greyish to dark olive on the back, the belly white, the fins whitish with the caudal edge black. We apprehend the cinnereous variety of *Muraena* *Myrus*, described by Forskal as being entirely of a cinnereous colour, with the fins white, and edged with black, may prove on further investigation, to be the young, or a variety of the *Conger* now taken near Mount Bay, Cornwall. One of the largest of these was taken at the mouth of the river Mersey, near the entrance of the Mersey, and is preserved in our Museum, the weight of which was one hundred and thirty pounds when first taken. Mr. Pennant heard of some caught near Scarborough, that were not less than a foot and a half in length, and eighteen inches in circumference in the thickest part. These we believe are the largest known.

These fish are chiefly taken by means of *butlers*, or strong lines, ten or twelve hundred feet in length, and furnished with a vast number of hooks, fastened at the distance of about six feet from each other, and baited with pilchard, or mackerel. The flesh of the *Conger* is well flavoured, and is much esteemed when roasted, but it is by extraction of the oil more commonly used. The fish is first boiled in water, and then the oil is pressed out by a screw. This oil is used in many different ways, and is much esteemed in the West Indies. These fish form an article of commerce on the Cornish coast, and in times of peace are exported from thence to Spain and Portugal. Dr. Boerhaave relates the manner in which the *Conger* is cured in Cornwall: they are slit, he tells us, and hung on a frame till they are dry, in the process of which a considerable quantity of oil exudes. It is remarkable, that a *Conger* of a hundred weight will waste by drying no more than one-fourth, or nearly four pounds. The flesh of the *Conger* dried is ground into powder, and employed in making soups.



PLATE CXX.

SCOMBER SCOMBER.

MACKAREL.

*** PISCES THORACICI.

GENERIC CHARACTER.

Head compressed, smooth: branchiostegous membrane of seven rays. Body smooth; lateral line carinated behind. Generally some spurious fins near the tail.

SPECIFIC CHARACTER

AND

SYNONYMS.

Spurious fins five both above and beneath.

SCOMBER SCOMBER: pinnulis quinque in margine utroque caudæ.

Bloch. Fisch. Deutschl. 2. p. 88. n. 1. t. 54.

Scomber scomber: pinnulis quinque. *Linn. Fn. Suec. 339. Gmel.*

Linn. Syst. Nat. T. 1. p. 1328. sp. 1.

Scomber pinnulis quinque in extremo dorso, spina brevi ad anum.

Art. gen. 30. syn. 48. spec. 68.

Palamis corpore castigato, &c. *Klein. miss. pisc. 5. p. 12. n. 5.*

t. 4. f. 1.

Mackarel. *Ray. Pisc. p. 58.*

Will Ichth. p. 181.

Penn. Brit. Zool. 3. p. 221.

PLATE CXX.

The great resort of the Mackarel is within the polar regions, where it is found in immense shoals, and of a larger size than in any other part of the world.

Besides the polar regions, this highly elegant and splendid fish is an inhabitant of the European, Atlantic, American, and Mediterranean seas, in all of which it appears at particular seasons of the year in vast shoals, bending their course, it is commonly supposed, from the frozen seas of the arctic circle in search of climates more favourable to the fulfilment of the great ordinance of nature,—the deposition of their spawn, and providing in an efficient manner for the security of the future brood.

This was the popular opinion long entertained, not only relative to the Mackarel, but also the Herring, and various other fishes which are known to inhabit high northern latitudes, and appear at stated seasons annually in the European seas. A contrary idea is at present maintained. Bloch, Lacepede, and some other late Ichthyologists, believe that those fish never leave the respective seas in which they appear at those regular intervals, but merely quit the vicinity of the shores at the approach of winter, and retire to the deep recesses of the sea, at some short distance. At those times it is imagined they conceal themselves in the mud and sand, and remain in a quiescent state till the warmth of the returning spring revives them to their wonted activity, when they again seek the shore to deposit their spawn, and after the breeding season is over, return as before to their hiding-places at the bottom of the sea.

The general size of the Mackarel is from twelve to fifteen or eighteen inches in length; it is reported to attain sometimes to the

PLATE CXX.

length of two feet. Mr. Pennant speaks of one that weighed five pounds and a quarter. This fish is of an inconceivable splendour when alive and first taken out of the water, at which period it emits a vivid phosphoric light. The male is of a more slender form than the female, and is also distinguished by having the transverse fasciæ or bands of black on the back and sides nearly straight, while in the female those bands are elegantly undulated.

The excellence of the Mackarel as an article of food is so generally admitted as to require no comment. Most commonly it is eaten fresh: in the county of Cornwall, upon the coasts of which it appears in immense shoals during the summer, it is occasionally salted. The Mackarel maintained considerable reputation among the epicures of ancient Rome, who, among other articles of luxury, prepared a celebrated garum or pickle of this fish, which they distinguished, according to Pliny, by the title of *Garum Sociorum*.

The number of rays in the fins of the specimen of the Mackarel selected for representation were as follow: in the first dorsal fin ten rays: second thirteen: pectoral thirteen: ventral six: anal eleven: and caudal twenty-two.

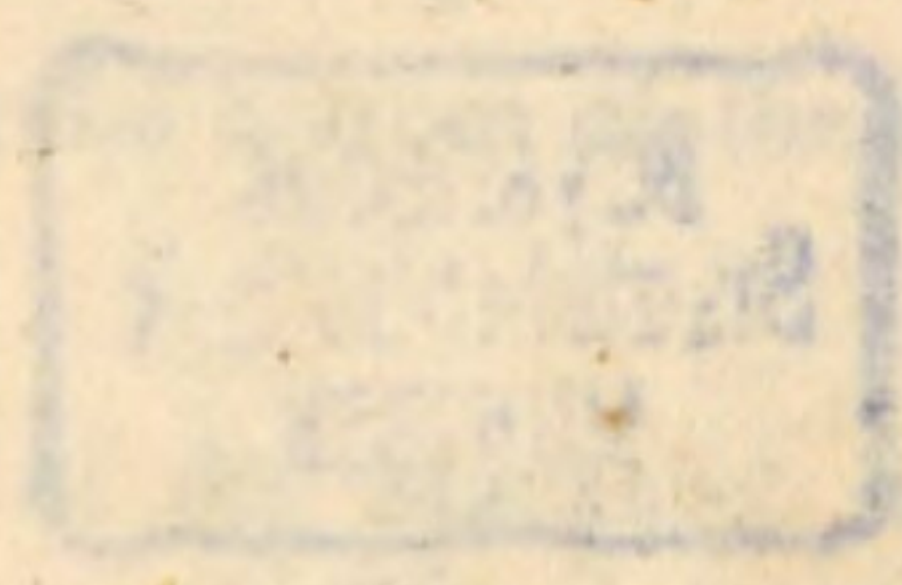


PLATE CXX.

length of two feet. Mr. Pennant speaks of one that weighed five pounds and a quarter. This fish is of an inconceivable splendour when alive and just taken out of the water, at which period it emits a vivid phosphoric light. The male is of a more slender form than the female, and is also distinguished by having the transverse fasciae or bands of black on the back and sides nearly straight, while in the female those bands are elegantly undulated.

The excellence of the Mackerel as an article of food is so generally admitted as to require no comment. Most commonly it is eaten fresh; in the county of Cornwall, upon the coast of which it appears in immense shoals during the summer, it is occasionally salted. The Mackerel maintained considerable reputation among the epicures of ancient Rome, who, among other articles of luxury, prepared a celebrated garum or pickle of this fish, which they distinguished, according to Pliny, by the title of *Garium Maccruum*.

The number of rays in the fin of the specimen of the Mackerel selected for representation were as follow: in the first dorsal fin ten rays; second thirteen; pectoral thirteen; ventral six; anal eleven; and caudal twenty-two.



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Donovan, Edward, 1768-1837

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